“A WINDOW OF OPPORTUNITY”: GENDER ATTITUDES AND PATTERNS OF ROMANTIC AND SEXUAL EXPERIENCES IN EARLY ADOLESCENCE

by

Anna E. Kågesten

A dissertation submitted to Johns Hopkins University in conformity with the requirements for the degree of Doctor of Philosophy

Baltimore, Maryland

March 2017

DISSERTATION ABSTRACT

Background

Early adolescence (ages 10-14) is a time of rapid and interconnected physical, cognitive and social changes that has special salience for sexual development. While the attitudes and behaviors adopted during these formative years carry lifelong sexual and reproductive health and rights (SRHR) consequences, little is known about gender attitudes and sexual experiences among very young adolescents (VYA).

Methods

A mixed-methods systematic review was conducted to synthesize the global peer-reviewed evidence on factors that influence gender attitudes in early adolescence globally. Thematic analysis was used to synthesize findings organized by the ecological framework. A cross-sectional study was conducted to describe the prevalence and patterns in romantic and sexual activities among a representative sample of 11-14-year-olds (in this dissertation I use this age group and VYA interchangeably) in the Korogocho informal (slum) settlement of Nairobi, Kenya (n=365). Latent class analysis (LCA) was used to develop a typology of romantic and sexual experiences. Latent class regression models were conducted to describe the characteristics of the identified subgroups, and subsequently to examine the association between gender attitudes and permissivness towards early heterosexual relationships with romantic and sexual experiences.

Results

The systematic review included 82 studies from 29 countries. Findings from these studies indicated that stereotypical or unequal gender attitudes are common in early adolescence, but vary by sociodemographic factors (e.g. sex, race/ethnicity, social class). Family

members and peers are central influences on VYA construction of gender attitudes, with differential pressures on boys and girls. Less is known about the role of community factors including media and school. Using LCA, the quantitative study identified three distinct sub-groups of romantic and sexual experiences: *Involved* (12%, high probability of being aware of sex and to have engaged in romantic and sexual activities); *Observant* (48%, high awareness but little own experience); and *Naïve* (40%, little awareness or personal experience). Involved VYA were more likely to be older, have started puberty, to be orphans, and to live in households of greater relative wealth. While endorsement of stereotypical norms related to male and female sexuality was relatively high, such attitudes were not associated with behaviors; rather, permissive attitudes towards early relationships were a more powerful correlate of VYA romantic and sexual experiences.

Conclusions

This dissertation shows that endorsement of stereotypical gender norms including a sexual double standard is common in early adolescence both globally and in Nairobi slums. However, it appears that for most VYA in the study context, such attitudes have not (yet) translated into sexual behaviors; early adolescence thus represents a window of opportunity to promote healthy sexual trajectories. The dissertation provides three key contributions: 1) synthesis of the evidence on key influences on VYA gender attitudes; 2) the development of a typology to measure VYA romantic and sexual experiences; and 3) analysis of gender attitudes as a potential driver of such experiences. These findings can be used to design and evaluate early prevention approaches aiming to transform harmful gender norms and to provide VYA with the SRHR support and information that they need to negotiate the timing and circumstances of romantic and sexual relationships.

COMMITTEE OF FINAL THESIS READERS

Committee Members:

Robert Wm. Blum, MD MPH PhD
Professor and Thesis Advisor
Department of Population, Family and Reproductive Health
Johns Hopkins Bloomberg School of Public Health

Jacky M. Jennings, MPH PhD
Associate Professor
Johns Hopkins School of Medicine

Kristin Mmari, MA DrPH
Associate Professor
Department of Population, Family and Reproductive Health
Johns Hopkins Bloomberg School of Public Health

Danielle German, MPH PhD
Assistant Professor
Department of Health, Behavior and Society
Johns Hopkins Bloomberg School of Public Health

Tamar Mendelson, MA PhD (non-voting member)
Associate Professor
Department of Mental Health

Alternate Committee Members:

Saifuddin Ahmed, MBBS PhD
Professor
Department of Population, Family and Reproductive Health
Johns Hopkins Bloomberg School of Public Health

Julie Denison, MHS PhD
Assistant Professor
Department of International Health

ACKNOWLEDGEMENTS

This dissertation is the tip of an iceberg, representing years of work that begun long before I enrolled in the PhD program; an endeavour that would not have been possible without the many individuals who have supported and encouraged me over the years.

My heartfelt thanks and appreciation to my advisor, Dr. Bob Blum, for his profound support, encouragement and wisdom. Thank you for believing in me when I first came to Hopkins, for encourgaing me to pursue a PhD and to undertake my own data collection, for opening career doors that I did not know existed, for constantly pushing me to re-think my ideas, spending *countless hours* meeting with me, reading and editing my work, for caring for my emotional well-being, and for being an incredible mentor, colleague and friend. I am so happy to have gotten to know you and your wife Michael, with whom I share many fond memories ranging from Thanksgiving football, special-brewed glögg, dinner parties featuring crashed car windows, and Åmål wedding celebrations.

Taking a step back, I would like to thank Dr. Karin Stenqvist and my other colleagues at the Region Västra Götaland Knowledge Center for Sexual Health for encouraging me to go back to school; and the Fulbright commission Sweden and Institute of International Education for helping me realize my dream of studying in the US.

I feel honored to have completed my PhD in the department of Population, Family and Reproductive Health. Thank you in particular to Deenah Darom for your tiredless support, and to Lauren Feretti Black, Gilbert Burnham and Rachel Reid for making life easier for us students. My sincere thanks to Dr. Caroline Moreau, who has been my

European grounding in the department and whose support, insight (and chocolate) has been key to my growth as a researcher. I will miss our remote office at Vino, and getting lost in odd locations even though we are *sure* of the direction. I would also like to thank the rest of the Global Early Adolescent Study team at Hopkins – Dr. Kristin Mmari, Lydia Animosa, Mark Emerson, Dr. Linnea Zimmerman – who have worked with me to design and implement surveys, guide analyses and solve ongoing logistical challenges. Thank you also to all of the professors who have taught classes and provided mentorship throughout my program, especially Dr. Michelle Hindin, Beth Frederick, Dr. Donna Strobino, Dr. Michele Decker, Dr. Amy Tsui, Dr. Courtland Robinson, Dr. Homayoon Farzadegan. And, to Juliana Zuccaro, Dr. Kate Baye, José "Oying" Rimon and other members of the International Conference on Family Planning team at the Bill and Melinda Gates Institute of Population and Reproductive Health.

I also want to explicitly thank my final defense committee for their thoughtful feedback and willingness to help me become an independent researcher: Dr. Jacky Jennings, Dr. Bob Blum, Dr. Kristin Mmari, and Dr. Danielle German.Thank you also to my willing alternates – Dr. Saifuddin Ahmed, Dr. Julie Denison and Dr. Tamar Mendelson – and to my preliminary oral examination committee members who helped shape the early stages of this research: Dr. Susan Sherman, Dr. David Holtgrave, Dr. Danielle German, Dr. Bob Blum, Dr. Michele Decker, Dr. Kristin Mmari and Dr. Saifuddin Ahmed.

Ever since I first set foot in the US I have benefitted from the genrous support from several donors who have made my studies possible: the Fulbright commission, P.E.O. International, Graduate Women International, Bill and Melinda Gates Institute for

Population and Reproductive Health, JHSPH Global Health Field Research Award, and the departmental awards including the Caroline Cocrance Award for Population and Reproductive Health and the Fellowship in Family Planning.

I must also thank my colleagues department of Reproductive Health and Research at the World Health Organization – Dr. Venkataram Chandra-Mouli, Dr. Avni Ami and Dr. Özge Tunçalp – for their collaboration and support of my research.

To the research team at the African Population and Health Research Center in Nairobi, I could not have wished for a more commited and thoughtful team: Dr. Caroline Kabiru, Beatrice Maina, Sylvia Njoki, our data collectors – especially Lucy Zakayo and James Hotendo – and the Nairobi Urban Health and Demographic Surveillance System. My most profound thanks goes out to all the children and adolescents in Korogocho who devoted their time to paricipate in this study – I owe this all to you.

The past five years have been the best and the worst of my life, and I would not have gotten through them without the support (and patience) of my friends, both near and far. My brilliant cohort family – Ann Herbert, Elizabeth Harvey, Eoghan Brady, Roxanne Mirabal-Beltran and Aravind Menon – whose intelligence and humour never seeze to amaze me. I could not have wished for a better cohort and I love you all. Other friends whom I first met in Baltimore – Saskia Nahrgrang, Karen Wiswall, Alex Secora, Kinsey Hasstedt, Kristin Veley, Susannah Gibbs, Meghan Bohren, Hannah Lantos, Amanda Kalamar, Jenita Parekh, Shani Turke, Jennifer Parsons, Sarah Peitzmeier, Trevor Heburn, Marcos Pozo Jatem, Kenny Morales. To my past room-mates, Andrew Marsh and Andrew Fish who have listened to my ranting (with grace) and offered therapy through

movies, ice-cream and outdoor life. And to my friends back home, even though you were far away you were always close in heart: Sofia Hammarström, Klara Abrahamsson, Marina Olsson, Johanna Moreno, Elin Norgren, Malin Lundgren, Malin Sundlöf, Johanna Heiman, Martin Forhaug, Viktoria Tagesson, Sara Dahlbom, Maria Thorell, Frida Mellberg, Cecilia Abrahamsson, Helena Haseler.

To my family: for helping me get through yet another degree, flying across the world to cheer on me, encourgaing my somewhat crazy endevours and being there come what may. Thank you to my dad, Jan Larsson, for your love and for being my role model in humanitarian work both locally and globally, and for helping me sort through career moves. To my mom, Gunilla Larsson, for putting up with my teenage nerves (that never seems to go away), for offering your love, support and genuine interest in my work, and for sending me lots of healing energy and love across the Atlantic! To my brothers, Anders and Daniel, for your support and compassion albeit my "bossy" manners. And to my wonderful grandparents and relatives in the Larsson/Sindsjö clans, and my extended family on the Kågesten/Tergil side who have been a source of joy during this journey.

Finally, but certainly not least, to my husband and best friend Gustav who knows me better than anyone and who has been a solid rock through the day-to-day crazyness, stress and ups and downs that come with the PhD process. Your decision to follow me to Baltimore, and your unwavered optimism, desire for adventure and to 'maximize' the experience where ever we travel, and your resilience and patience is what has kept me going for the past years. Marrying you (twice) has been, and continuous to be, an adventure, the best of my life. I am so fortunate.

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

LIST OF ACRONYMS

ACE	Adverse Childhood Experiences
AIC	Akaike's Information Criteria
AIDS	Aquired Immun Deficiency Syndrome
APHRC	African Population and Health Center
BIC	Bayesian Information Criteria
CI	Confidence Interval
CSE	Comprehensive Sexuality Education
DHS	Demographic and Health Survey
EFA	Exploratory Factor Analysis
GEAS	Global Early Adolescent Study
HIV	Human Immunodeficiency Virus
HSV-2	Herpes Simplex Virus 2
IQR	Inter-Quartile Range
JHBSPH	Johns Hopkins Bloomberg School of Public Health
LCA	Latent Class Analysis
LCR	Latent Class Regression
LMICs	Low- and Middle-income Countries
NUHDSS	Nairobi Urban Health and Demographic Surveillance System
OR	Odds Ratio
OVC	Orphans and Vulnerable Children
PCA	Principal Component Analysis
SDGs	Sustainable Development Goals
SRHR	Sexual and Reproductive Health and Rights
STI	Sexually Transmitted Infections
TPB	Theory of Planned Behavior
TGP	Theory of Gender and Power
TTA	Transitions into Adulthood Study
UN	United Nations
UN-HABITAT	United Nations Human Settlement Programme
UNFPA	United Nations Population Fund
UNICEF	United Nations Children's Fund
US	United States
VYA	Very Young Adolescents
WHO	World Health Organization

Chapter 1 : Introduction

> *Focusing attention on young adolescents is a smart investment, as this is the period where lifelong health behaviors are formed, when pathways of opportunity or risk emerge, and when the future life course begins to take shape (…) Gathering evidence about the timing, nature, and consequences of the key transitions that young adolescents undergo is critical for the development of appropriate policies and programs for this population*.
>
> Investing when it counts, Population Council 2016 [1]

> *Inequitable gender norms hurt both boys and girls, but the burden is particularly high for girls, effectively limiting the ability of half of the population to fully realize their potential. More than half of 10-year-old girls today live in countries that can be considered to be very unequal in terms of gender. Addressing these inequalities will require a better understanding of who these children are, their vulnerabilities and the challenges they will face as they transition through adolescence into adulthood.*
>
> State of world population report, UNFPA 2016 [2]

As reflected in the above quotes, the strategic value of investing in very young adolescents (VYA) is increasingly recognized by global actors in the field of sexual and reproductive health and rights (SRHR). Because of the dramatic physical, social and emotional changes that occur, the ages 10-14 are a pivotal time of human development, and the attitudes and behaviors adopted during these formative years carry lifelong SRHR consequences [3,4]. In particular, it is time when personal attitudes or views towards gender norms (from hereon referred to as gender attitudes) which can undermine as well as promote sexual health and wellbeing become solidified [1,5]. Yet, little is known about gender attitudes during this period of life, and about the extent to which such perceptions shape emerging romantic and sexual behaviors.

By age 15, outcomes related to unsafe sexual behaviors are a leading cause of mortality and morbidity among adolescents globally, particularly in sub-Saharan Africa. Because of this, over the past decades, countries in sub-Saharan Africa have increasingly

invested resources in adolescent SRHR programs and services; however, the beneficiaries of such strategies tend to be those aged 15 and beyond, while younger adolescents are often ignored [6]. Many VYA therefore transition into puberty without adequate knowledge and skills about body changes, fertility, sexuality and relationship negotiation [4]. In order to design program content tailored for the SRHR needs of VYA, it is essential to understand rates and patterns of sexual activities [7]. However, to date most research has dichotomized adolescent "sexual experience" based on whether sexual intercourse ever occurred, thereby failing to take into account the wide range of romantic and sexual feelings and activities that all are part of sexual development and which together drive SRHR outcomes [8-11].

In this dissertation I explore factors that influence VYA gender attitudes globally, and further investigate gender attitudes related to sexuality and early (hetero)sexual relationships among VYA in Nairobi, Kenya – a setting where gender inequalities remain pervasive. In addition, I seek to develop a typology of early adolescent romantic and sexual experiences and further investigate the association between such experiences with gender and sexual relationship attitudes. In Kenya, the likelihood of adverse SRHR outcomes is especially high in slums; one example being that adolescents in Nairobi slums initiate sexual relations on average three years earlier than peers in non-slum areas [12,13]. This dissertation may thus help education and public health programs better target services and interventions based on a more nuanced understanding of the sexual experiences and needs of VYA in urban slums.

BACKGROUND

Early adolescence: a time of transitions

There are currently more adolescents aged 10-19 years in the world than ever before, over 1.2 billion, of whom nearly nine in ten live in low and middle-income countries (LMICS). VYA account for about half of the world's population of adolescents, and their sheer size relative to the general population is especially large in sub-Saharan Africa [1]. The early adolescent years involve a series of interconnected pubertal, brain, cognitive, social and sexual developmental changes; each of which affects sexual behaviors and health [1,3]. First, puberty triggers a range of physical changes such as a rapid growth spurt, development of secondary sex characteristics, change in body composition, and increased sexual drive [14]. Data indicate that the age of puberty (which generally occurs between 12 and 16 years) has declined globally over the last 30 years, thereby widening the period during which VYA (especially girls) are exposed to sexual risks [1]. Secondly, because neuro-maturation continues well into early adulthood, capacities related to impulse control, decision-making and abstract reasoning are less developed in younger than older adolescents [15] and thus they may be less prepared for sexual decisions [16]. Third, VYA become increasingly aware of their own femininity and masculinity and concurrently face increased pressures to confirm to socially constructed gender norms [4,17]. With puberty, boys in many sub-Saharan African contexts are given increased social freedom to move outside the home, thereby increasing both their opportunities to socialize but also their exposure to community risk factors such as violence and substance use, as well as expectations to work and contribute to the family economy. In contrast, girls' social mobility often decreases due to adult concerns about their sexual

vulnerability, and at the same time they are expected to take on more household duties. In some contexts, girls may also be considered ready for marriage, sexual relations and parenthood [4].

Adolescent sexual development

Adolescent sexual development is a complex process that begins long before the initiation of any sexual activities. While its definitions vary, the National Commission on Adolescent Health defines sexual health as "encompassing both sexual development and reproductive health" including the "ability to develop and maintain meaningful interpersonal relationships; appreciate one's own body; interact with both genders in respectful ways; and express affection, love and intimacy in ways consistent with one's own values" [18]. During early adolescence both boys and girls may start to develop interest and curiosity in the opposite (or same) sex and associated romantic activities such as having "crushes", flirting or dating. When they occur, romantic experiences are usually brief, non-exclusive and occur in groups [19]. Concurrent with puberty, VYA may also being to experience sexual desires, fantasies, and attractions [19]. For some this can involve the exploration of different types of sexual activities, both autoerotic (e.g. masturbation) and partnered [20]. Partnered sexual behaviors, the focus of this dissertation, can include penetrative activities (vaginal, oral or anal sex) but also non-coital behaviors such as spending time together alone with a boy/girlfriend, holding hands, kissing, hugging/cuddling, touching on top of or under clothes [19-21], and "sexting" (exchanging sexually explicit messages/pictures using phones or media) [22].

Measuring adolescent sexual experiences: beyond vaginal sex

Given the complex nature of adolescent sexual relations, the common dichotomization of adolescents as sexually "experienced" versus not is problematic for several reasons. First, restricting sex to penile-vaginal intercourse tells us little about the full spectrum of sexual expectations and practices which all are part of sexual health and development [8-10,23]. Secondly, many studies assume that sexually experienced adolescents are sexually *active* while in fact they may only have had vaginal sex once [24]. Surveys also face challenges in terms of what "counts" as sex among VYA; for example, "playing sex" with peers may not be considered as *real* sex but rather as a causal game without personal consequences [25]. Third, while studies indicate a gradual progression from less to more intimate sexual activities across different cultural settings [11,23,25], this is not always the case as for some adolescents intercourse may not be preceded by less intimate activities [25]. As will be further discussed in Manuscript II (Chapter 4), studies conducted primarily in North America and the UK have begun to demonstrate the relevance of distinguishing typologies or sub-groups of adolescents based on patterns of sexual behaviors, and such approaches have become increasingly refined with the use of cluster-based analytics such as Latent Class Analysis (LCA). For example, a US-based study used LCA to classify 12 -year-olds girls into three distinct groups: those with *no* (48%), *mild* (46%, spending time along, holding hands, hugging, kissing) and *moderate* (6%, laying down together, touching on/under clothes, oral sex) sexual experiences [26].

Early sexual initiation as a public health concern

From public health perspective it is important to note that sexual initiation in early adolescence is not risky *per se;* rather, it is the potential consequences and circumstances

associated with early sexual debut that are risky. First, early sexual debut, especially when forced or coerced, increases the risk of exposure to HIV and other sexually transmitted infections (STIS) [1,27,28]. According to a recent UNICEF report, 10-19 -year-olds is the only age group where the HIV prevalence has increased (from 1.4 to 1.8 million between 2005-2015). Over 80% of 15-19 -year-olds living with HIV reside in sub-Saharan Africa, which is also where two in three new infections occur [29]. The prevalence of herpes simplex (HSV-2), one of the most common STIs globally, is also highest among adolescents in sub-Saharan Africa [30] and young age is a risk factor for Chlamydia [27]. The burden of human papillomavirus, a precursor of cervical cancer, is also high [31]; VYA are a key prevention group given the WHO's recommendation to vaccinate girls aged 9-13 [32].

Early sexual activity also increases the risk of maternal mortality and morbidity due to complications during pregnancy, childbirth and unsafe abortions [33]. VYA girls account for almost one in three births (2 million) of the 7.3 million births occurring to girls under the age of 18 in LMICS [33,34] and have substantially higher risk of eclampsia, placental tears and abnormalities and post-partum hemorrhage compared to older peers [33]. The risk of adverse outcomes is especially high if girls become pregnant while their pelvis and birth canals are still growing, generally up to two years after menarche [33,34]. Most pregnancies and births to VYA in sub-Saharan Africa occur within the context of marriage and about one in ten girls marry before their 15th birthday [35]. Early marriage and pregnancy may also constrain girls' abilities to complete school, thereby jeopardizing their future economic and social protective opportunities [33].

Furthermore, VYA boys and girls may have limited power in intimate relationships including sexual encounters, particularly in relation to older partners [16]. Indeed, the younger the age at first sex, the more likely it is to be forced [31]. Sexual coercion constitutes a global pandemic among adolescent girls [36] and can occur both through physical and psychological violence including economic or social threats [37]. Rates are especially high in Eastern and Southern Africa where an estimated 21% (10%–34%) of sexually experienced adolescent girls aged 15-19 years report forced sexual debut[1] [36]. Although girls disproportionally experience coerced first sex, boys may also be victims and not just perpetrators: in a nationally representative study involving 12-19 -year-old boys in Malawi, Ghana, Uganda and Burkina Faso, between 4-12% reported coerced sexual initiation [38]. Coerced sexual initiation has been assoiated with non-use of condoms and other contraceptives and found to increase the risk of HIV/STIS as well as unintended pregnancies [36]. In addition, intimate partner violence, which can include sexual coercion and affects about one in three ever-partnered women globally, is linked with depression and poor reproductive health outcomes (e.g. low birth weight) [39].

Gender, gender norms and sexual behaviors

Sexual behaviors and SRHR outcomes are intrinsically linked to gender [40,41]. From a biological perspective, females are exposed to a greater degree of physical risks and complications related to pregnancy, childbirth and unsafe abortions, than are males [33]. Additionally, females are more likely than men to be infected by HIV/STIS during unprotected sexual intercourse due to anatomical reasons (the delicate mucous membrane

[1] Based on meta-anlaysis of DHS data across 17 countries, which measured forced sexual debut through the question ”the first time you had sexual intercourse, would you say that you had i because you wanted to, or because you were forced to have it against your will?” [36].

that covers the vagina is more susceptible to viruses and bacteria than the relatively thick skin of the penis) [42]. These biological differences interact with the social domain of gender to impact adolescent SRHR outcomes for both boys and girls. While perceptions of the "ideal" man and woman vary, in most societies a set of stereotypical gender norms exists. Connell describes one dominant *hegemonic masculinity* ideal, characterized by stereotypical masculine men's power over women as well as more marginalized masculine identities (e.g. men who act feminine) [43]. Evidence indicates that young men who adhere to such norms are more likely to engage in early and risky sexual behaviors including unsafe sex and concurrent partnerships [44,45] and to use violence in intimate relationships [41,46]. Hegemonic masculinity has been contrasted to *emphasized* or *acquiescent femininity* ideals, centered on women's compliance with gender inequality and their subordination to men [47]. Young women who ascribe to a more acquiescent version of femininity have been found to experience lower control in sexual relations [41], earlier sexual initiation [48], greater partner sexual concurrency [49], greater risk of HIV and more intimate partner violence [50]. However, not all stereotypical gender norms are harmful; it is the rigidity of norms that constantly expects boys and girls to abide by gendered rules that is problematic. In addition, gender norms are relational in that both men and women contribute to the construction of harmful stereotypes [47].

In this dissertation I focus on *personal attitudes* towards gender norms; that is, the extent to which individual VYA endorse socially constructed gender norms. An elaborated definition of key termionologies is provided in Manuscript I (Chapter 3).

STUDY SETTING

Located at the Equator in Eastern Africa, Kenya borders the Indian Ocean, Somalia, South Sudan, Tanzania, Uganda and Ethiopia. While English and Swahili are the official languages, Kenya is home to 42 ethnic groups (the largest being Kikuyu, Luhya, Luo, Kalenijn, Kamba, Kisii and Meru), each with their own language and traditions [51]. Many different religions are practiced, the most common being Christian-Protestant (45%), Roman Catholic (33%), Islam (10%) and indigenous religions (10%) [51]. Kenya's population is growing rapidly; it has more than quadrupled from 10 million in 1967 to 46 million in 2015 [52] and is expected to reach 77 million by 2050 [53]. The population is characterized by a large youth bulge with about 20% aged 10-19 years; VYA account for about 13% of the population [53]. While about half of VYA live with both biological parents, a large proportion live with one or neither parent; approximately 15% are orphans. Most (96%) of 10-14 -year-olds are enrolled in primary school although school attendance rates decline substantially after age 15 [54].

Kenya's Human Development Index[2] was 0.55 in 2014, which is classifies as low development [55]. Nevertheless, Kenyan adolescents are growing up in a country and region undergoing rapid socioeconomic, health and environmental changes that are the result of urbanization, increased school enrollment and availability of jobs, delayed age of first marriage and childbearing, increased use in modern contraceptives and decreased fertility rates [54,56,57]. The country has made substantial progress toward meeting the global goals related to maternal, reproductive and child health. While the maternal

[2] The Human Development Index, published by UNDP, is a summary measure that reflects average achievement in key dimensions of human development, including: life expectancy at birth; mean years of schooling for adults aged 25 years and expected years of education for children entering school; and gross national income per capita (http://hdr.undp.org/en/content/human-development-index-hdi).

mortality ratio remains high at 362 maternal deaths per 100,000 live births, the infant mortality rate declined from 49 to 39 per 1,000 births between 2009 and 2014; the under-five mortality rate declined from 74 to 52 per 1,000 live births; and the total fertility rate declined from 8.1 in 1978 to 3.9 births per woman in 2014. About half of unmarried sexually active 15-19 -year-olds are using modern contraceptives, with the most common methods being male condoms (27%), injectables (14%) and implants (6%). One in four report an unmet need for family planning [54]. Abortion remains illegal, but can be permitted if a woman's health or life is in danger; a nationally representative survey estimated the abortion rate to 48 per 1,000 women [58]. Challenges also remain with regards to the HIV/AIDS epidemic in Kenya, with 1.5 million people (6%) living with HIV [59]. Young people are substantially affected as Kenya is one of six nations that account for half of the world' HIV-infected adolescents, and approximately 1.1 children have been orphaned by AIDS [29]. Loss of people of working age due to the HIV epidemic has severe economic implications as it affects households, agriculture, and industry production [59]. As is the case throughout sub-Saharan Africa, young women carry the largest burden in terms of both HIV prevalance and incidence [29].

Growing up in slums: a threat to healthy adolescent development

Urban poor adolescents and particularly those residing in slums[3] constitute a vulnerable and fast growing population worldwide [62]. It is estimated that 60% of the world's population will live in cities by 2030, and of these two in three will be under age 18. The sub-Saharan African region has the fastest growing urban population in the world, at an

[3] While concerns have been raised about the pejorative nature of the term "slum", it is the terminology used by the UN [60]. The UN-Habitat defines a slum as a "group of individuals that live under the same roof that lacks one ore more of the following conditions; access to improved water, access to improved sanitation, sufficient living space, durability of housing and secure tenure" [61].

annual rate of 4% [63]. The massive urban growth in cities like Nairobi has been accompanied by the proliferation of sprawling slum areas, characterized by widespread unemployment, violence, limited access to basic facilities (water, sanitation), health care, and education services [60,64]. About half (56%) of the urban population in sub-Saharan Africa lives in slums, and this proportion is expected to grow to 70% by 2050 [65].

Growing up in slums is a threat to healthy adolescent development including SRHR [62,64,66]. Indeed, the densely packed environments of slums with poor sanitation and social insecurity result in unique neighborhood effects that make slum residents particularly vulnerable to poor health outcomes [60]. Compared to those in non-slum urban areas, adolescents growing up in slums have higher risk of early sexual debut, unintended pregnancy, early childbearing, STIs and HIV as well as maternal mortality and morbidity [12,64]. Unique attributes that may facilitate early sexual relations in slums include crowded housing with limited privacy, whereby shared sleeping spaces expose children to parents' sexual activity [13]. Such space constraints may also force adolescents to move out of the home at early ages, thereby restricting parents or guardians' ability to monitor risky behaviors [12]. Young people growing up slums may also have greater opportunities to socialize with peers of the opposite sex, increasing the likelihood of intimate relations [67]. However, the social and physical neighborhood effects of slums are not only risk factors but also offer opportunities for the implementation of interventions, for example through the ability to reach a large number of people at relatively low costs [66].

Gender roles and norms in Kenya

In 2015 Kenya ranked number 48 out of 145 countries on the Global Gender Gap Index[4], a substantial advancement from 78th in 2013 [68]. Despite the improvement gender inequalities persist and gender norms are largely patriarchal. While the gender gap in education has narrowed during primary school, the proportion of adults with any secondary school is lower females than males (25% vs. 31%). Women also have less labor market participation (62% vs. 72%), and hold fewer parliamentary seats and government positions than men [55]. Men head about 60% of households and polygyny is common in rural areas such as the North Eastern province (but relatively uncommon in Nairobi where <5% report multiple wives) [54]. Social and cultural systems dictate that women have little control in sexual relations [69]. Pre- and extramarital relations are tolerated and even expected of men, whereas women are expected to be virgins at marriage and remain monogamous thereafter. Dowries, or bride price payments, are common and further reflect the idea that a woman is a man's property [70]. According to the 2014 Kenyan DHS (KDHS), about one in four Kenyan men and women justify wife beating under certain circumstances. Gender-based violence remains common with high proportions of women reporting lifetime physical (44%) and sexual violence (14%), and 12% reporting forced sexual initiation [54].

(Early) adolescent romantic and sexual relations in Kenya

In Kenya, significant shifts have occurred with adolescent relationships, particularly in urban areas, toward more "Western" stereotypes of romantic or "dating" relationships,

[4] The Global Gender Gap Index is designed to measure gender-based gaps in access (rather than actual access) to resources and opportunities within countries, including outcomes indicators related to health and survival, educational attainment, economic participation and opportunity, and policital empowerment (http://www3.weforum.org/docs/GGGR2015/cover.pdf).

non-marital sex with the opposite sex, and the self-selection (rather than kin-selection) of spouses [67]. According to the 2014 KDHS, 12% of adolescent girls and less than 1% of boys aged 15-19 are currently married. Nonetheless, 21% of young men and 12% of young women aged 15-24 years report sexual debut before age 15; and 37% of 15-19 -year-olds report having had sexual intercourse [54]. Young men are more likely than women to report an early debut across most age groups, and have a slightly lower median age at first intercourse (17.4 years for men vs. 18.0 years for women). Sexually experienced adolescent boys aged 15-19 years also have a higher mean number of lifetime sexual partners than women (4.4 vs. 1.8) and are more likely to report two or more sexual partners in the past 12 months [54].

While few studies have included VYA, one notable exception is the longitudinal Transitions into Adulthood (TTA) undertaken with 12-19 -year-olds in Nairobi slums, in which 3% of both boys and girls aged 12-14 years reported ever having had sexual intercourse [71]. Similarly, the 2015 Adolescent Girls Initiative baseline study estimated a prevalence of sexual intercourse of 2% among girls aged 11-14 years in the Kibera slum of Nairobi [72]. Less data is available for non-coital activities. In the only identified Kenyan study, about one in ten adolescents with mean age 14 who had not had intercourse reported lifetime non-coital sex [12]. Most VYA in Nairobi slums appear to initiate intercourse together with non-cohabiting partner although girls are more likely to debut together with a co-habiting partner (typically within marriage) [71,73]. For boys, this partner is typically a same-aged or younger girl while for girls it is an older man [73]. VYA appear to be less likely than older peers to use contraceptives at first intercourse: only 5% of boys and 15% of girls aged 12-14 reported doing so compared to 33% of 15-

19 -year-olds in the TTA study [71]. Most of the very few VYA who had intercourse reported that they were "very willing" their first time; however, girls were twice as likely than boys to report unwanted initiation (9% vs. 4%) [71,73].

Given that premarital sex is becoming increasingly common, attitudes towards premarital sex (which have historically been conservative although varying by ethnic groups and region) may be changing towards more permissive among young people [67]. However, the TTA study found that a majority (>90%) of 12-14 -year-olds reported that young women as well as young men should remain virgins until marriage. In addition, relatively low proportions (30% males, 29% females) perceived sex to be something that "just happens" [71]. These data are supported by the qualitative findings from the Global Early Adolescent Study (GEAS), where VYA across different cultural settings expressed low permissiveness towards early romantic and sexual relations. In particular, VYA in Nairobi underscored negative consequences for girls who engage in intimate relationships with boys, including risk of pregnancy, physical abuse, and school dropout [74].

THEORY AND CONCEPTUAL FRAMEWORK

This dissertation draws on a number of theories that are relevant for understanding patterns of adolescent romantic and sexual activities, and the role of gender in shaping such relationships. While not explicitly described in the three manuscripts, I apply a *social constructionist* perspective to romantic love, sexuality and gender in that I view these to be dynamic and socially constructed rather than permanent or biologically determined human experiences. Social constructionism is not a theory *per se*, but a conceptual paradigm that recognizes that knowledge is intrinsically connected to the researcher's own role in understanding and highlighting research findings [75]. This

dissertation is thus a result of the interpretations that I have made in collaboration with my advisor and co-authors throughout the research process.

Sexual script theory

Developed by Gagnon and Simon in the 1970s, scripting theory has been widely used to guide past research on sexuality and sexual behaviors [76]. The premise of the script perspective is that all human behaviors, including those sexual, are socially scripted, much like a performance in a play. Implicit in this assumption is that behaviors become "sexual" when defined as such by a society or group, or from individual's own experiences. These scripts instruct individuals how to understand and act in sexual situations, and operate at intrapersonal, interpersonal and cultural levels. Sexual script theory is especially relevant for this dissertation given that adolescence is a central period when such scripts evolve and become increasingly refined along with the onset of puberty and sexual development [76].

Theory of Gender and Power

The terms "sex" and "gender" are often (and incorrectly) used interchangeably and in a categorical fashion, which fails to capture the full dynamics of gender. While we are assigned a sex (male or female) at birth, this biological sex may not align with how individuals define their gender (e.g., as man, woman or transgender) or their expressions and endorsement of femininities and masculinities [43,77,78]. From birth throughout life, individuals are socialized to conform to cultural norms about the roles, traits, behaviors, values and power associated with masculinities and femininities. However, as Connell [47] notes, individuals are not just passive recipients of gender norms but actively

involved with constructing gender through interpersonal relations (families, peers, partners) and via schools, media, laws, policies and other institutions.

Connell's *Theory of Gender and Power* (TGP) is especially useful for understanding how gender shapes sexual behaviors at different levels [43]. The TGP emphasizes three interlinked structures that work together to govern the production of gender inequality across societies; thus, neither can be analyzed without taking into account the other structures [43,47,79]. In relation to VYA, the first structure (*sexual division of labor*) can be thought of as background characteristics, e.g. unequal opportunities for boys and girls in terms of schooling and work in or outside of the household. The second structure (*sexual division of power*) assumes that boys traditionally have greater control than girls over when, how and under which conditions sexual activities occur. For VYA, power may be reflected in age-discrepancy and relation to partner, substance use, and history of violence. Sexual division of labor and power interact with a third structure (*cathexis),* which relates to affective attachments and social norms. Applied to VYA, this structure dictates what is considered appropriate emotional and sexual relations for women, girls, men and boys, i.e. gender norms and attitudes.

Theory of Planned behavior

Azjen's [80] Theory of Planned Behavior (TPB) is used to understand the role of attitudes and norms in shaping behaviors. According to TPB, behavioral intentions (e.g. expectations to have sex) constitute the strongest predictors of behaviors, and such intentions are in turn shaped by *attitudes* specific to the behavior in question and by *perceived social norms.* The more favorable the attitude the stronger is the intention towards performing a behavior, and the likelihood that it actually happens. In addition,

perceived behavioral control (ability to perform or resist a specific activity) influences behaviors both directly or indirectly (through intentions). The notion of perceived behavioral control – which may differ from actual control - is rooted in Bandura's concept of *self-efficacy or agency* [81]. The central role of self-efficacy in shaping sexual experiences is especially relevant among VYA, who given their age and evolving cognitive capacities may not have full control over their intentions.

Conceptual Framework

The conceptual framework (Figure 1.1) for this dissertation integrates key components of the theories noted above as well as past research on factors that influence adolescent sexual behaviors. It is organized in line with Bronfenbrenner's ecological model, which views individuals as nested within their environment and social contexts [82]. The *societal* level represents broader structural and social factors, for example laws, policies, economic systems and cultural norms related to appropriate ages and contexts for boys and girls to engage in sexual relationships. The *community* level includes the influence of media (use and access), school and religious or other types of institutions. The *interpersonal* level refers to relations with family, peers and partners which in turn influence and interact with the most proximal determinants of gender attitudes and sexual behaviors at the *individual* level. An ecological system is relevant to my research because it recognizes the complex and reciprocal influences on adolescent gender attitudes and sexual behaviors, and that sexual decisions rarely are made in a vacuum. This is especially pertinent to VYA who because of their developmental stage may be prone to external influences and pressures. While not directly measured beyond individual gender attitudes, the social structures of gender are present at all levels of the framework.

Individual gender attitudes are both an outcome and exposure. I first explore ecological-level factors that may influence gender attitudes among young adolescents globally through a systematic review (Aim 1). I then develop a typology of romantic and sexual experience patterns among young adolescents in Nairobi slums (Aim 2), and examine the characteristics of each sub-group. For Aim 3, I use a more specified framework (Figure 1.2) drawing on the TGP to highlight how gender attitudes may interact with other normative factors (e.g. peer norms) as well as power-related (e.g. violence) and background factors (e.g. age, schooling) to shape romantic and sexual experiences. I also explore the potential mediating role of permissive relationship attitudes. Given the current evidence of low permissiveness towards early premarital relations in Nairobi slums noted earlier, it is reasonable to hypothesize that such perceptions are more proximate determinants of behaviors than gender attitudes. A number of other factors are beyond this dissertation (and are therefore *italicized*). For example, survey limitations precluded the inclusion of sexual intentions and self-efficacy.

SPECIFIC AIMS AND HYPOTHESIS

Aim 1. Explore factors that influence gender attitudes in early adolescence (ages 10-14) by conducting a mixed-methods systematic review.

Aim 2. Describe the prevalence and patterns of romantic and sexual (non-coital and coital) experiences among VYA aged 11-14 years in a Nairobi slum settlement.

> **Sub-Aim 2a.** Develop a typology of VYA romantic and sexual experiences using latent class analysis.
>
> **Sub-Aim 2b**. Examine the individual, interpersonal and community-level characteristics of the identified typology groups.

Aim 3. Assess different domains of gender and (hetero)sexual relationship attitudes among VYA aged 11-14 years in a Nairobi slum settlement.

Hypothesis 3.1. *Boys will be more likely than girls to endorse stereotypical gender norms that perpetuate a sexual double standard.*

Sub-Aim 3a. Examine the association between gender and sexual relationship attitudes with the romantic and sexual experience typology developed in Aim 2a.

Hypothesis 3.2. *Gender attitudes will differ across the typology groups in that attitudes will be more stereotypical among those reporting more romantic and sexual experiences.*

Hypothesis 3.3. *The association between stereotypical gender attitudes and romantic and sexual experiences will be mediated by permissive attitudes towards early heterosexual relationships.*

DISSERTATION OVERVIEW

This dissertation consists of three manuscripts, each of which includes an introduction and description of the methods in addition to the results and discussion. **Chapter 1** provides an overview of the dissertation background, significance and study setting, theory and conceptual framework, and the specific aims and hypotheses. **Chapter 2** describes the methods including data collection and analysis. **Chapter 3** contains the first manuscript, entitled *Understanding factors that shape gender attitudes in early adolescence globally: A mixed-methods systematic review*. Results from a systematic review related to influences on VYA gender attitudes are presented, drawing on a thematic synthesis of the evidence from 82 studies conducted in 29 countries. **Chapter 4** presents the second manuscript, entitled *'Inexperienced?' Exploring patterns of romantic*

and sexual experiences among urban poor young adolescents in Nairobi, Kenya, which explores the prevalence and patterns of romantic and sexual activities in a sample of 11-14 -year-olds (N=365) in the Korogocho slum. LCA is used to develop an inductive typology of romantic and sexual experiences and describe the characteristics of each sub-group. **Chapter 5** contains the third manuscript, entitled *Are gender attitudes associated with romantic and sexual experiences in early adolescence? Findings from Nairobi, Kenya*. Using the same quantitative dataset, this study examines the extent to which VYA endorse stereotypical gender norms related to sexuality; their permissiveness towards early heterosexual relationships; and the association between gender attitudes with the romantic and sexual experience typology developed in Chapter 4. Finally, **Chapter 6** provides an overview of the conclusions drawn in each study, limitations and strength, the public health and research implications, and overall conclusions of the dissertation.

CHAPTER 1 REFERENCES

1. McCarthy K, Brady M, Hallman K. Investing when it counts: Reviewing the evidence and charting a course of research and action for very young adolescents. New York: Population Council. 2016.

2. UNFPA. 10. How our future depends on a girl at this age. State of world population 2016. New York: UNFPA; 2016.

3. Blum RW, Astone NM, Decker MR, Mouli VC. A conceptual framework for early adolescence: A platform for research. Int J Adolesc Med Health. 2014;26: 321-31.

4. Igras SM, Macieira M, Murphy E, Lundgren R. Investing in very young adolescents' sexual and reproductive health. Global public health. 2014: 1-15.

5. Marston C, King E. Factors that shape young people's sexual behaviour: A systematic review. Lancet. 2006;4: 1581-1586.

6. Bruce J, Chong E. The diverse universe of adolescents, and the girls and boys left behind: a note on research, program and policy priotiries. New York, NY: UN Millenium Project; 2006.

7. Palmer L. Advancing promising program and research/evaluation practices for evidence-based programs reaching very young adolescents: A review of the literature. Washinton, DC: Institute for Reproductive Health, Georgetown University; 2010.

8. de Graaf H, Vanwesenbeeck I, Meijer S, Woertman L, Meeus W. Sexual trajectories during adolescence: Relation to demographic characteristics and sexual risk. Arch Sex Behav. 2009;38: 276-282.

9. Dixon-Mueller R. Starting young: Sexual initiation and HIV prevention in early adolescence. AIDS and Behavior. 2009;13: 100-109.

10. Miller KS, Clark LF, Wendell DA, Levin ML, Gray-Ray P, Velez CN, et al. Adolescent heterosexual experience: A new typology. Journal of Adolescent Health. 1997;20: 179-186.

11. Upadhyay UD, Hindin MJ, Gultiano S. Before first sex: Gender differences in emotional relationships and physical behaviors among adolescents in the Philippines. Int Fam Plan Perspect. 2006;32: 110-119.

12. Kabiru CW, Beguy D, Undie CC, Zulu EM, Ezeh AC. Transition into first sex among adolescents in slum and non-slum communities in Nairobi, Kenya. Journal of Youth Studies. 2010;13: 453-471.

13. Dodoo FN, Zulu EM, Ezeh AC. Urban-rural differences in the socioeconomic deprivation-sexual behavior link in Kenya. Soc Sci Med. 2007;64: 1019-1031.

14. Crockett LJ, Raffaelli M, Moilanen KL. Adolescent sexuality: Behavior and meaning. Faculty Publications, Department of Psychology. 2003: 245.

15. Steinberg L, Morris AS. Adolescent development. Annu Rev Psychol. 2001;52: 83-110.

16. Dixon-Mueller R. How young is "too young"? Comparative perspectives on adolescent sexual, marital, and reproductive transitions. Studies in family planning. 2008;39: pp. 247-262.

17. Hill J, Lynch M. The intensification of gender-related role expectations during early adolescence. In: Brooks-Gunn J, Petersen A, editors. Girls at Puberty: Springer US; 1983: pp. 201-228.

18. National Commission on Adolescent Sexual Health. Facing facts: Sexual health for America's adolescents New York: Sexuality Information and Education Council of the United States; 1995.

19. Auslander BA, Rosenthal SL, Blythe MJ. Understanding sexual behaviors of adolescents within a biopsychosocial framework. Adolesc Med State Art Rev. 2007;18: 434-448, v.

20. Jakobsen R. Stages of progression in noncoital sexual interactions among young adolescents: An application of the Mokken scale analysis. International Journal of Behavioral Development. 1997;21: 537-553.

21. Hansen WB, Paskett ED, Carter LJ. The Adolescent Sexual Activity Index (ASAI): A standardized strategy for measuring interpersonal heterosexual behaviors among youth. Health Education Research. 1999;14: 485-490.

22. Muller J. Teenage girls' sexting in Cape Town, South Africa: A child-centred and feminist approach. In: Buskens I, Webb A, editors. Women and ICT in Africa and the Middle East. London: Zed Books; 2014.

23. Hensel DJ, Fortenberry JD, Orr DP. Variations in coital and noncoital sexual repertoire among adolescent women. J Adolesc Health. 2008;42: 170-176.

24. Aral S, Willard CJ. The Multiple dimensions of sexual behavior as risk factor for sexually transmitted disease: The sexually experienced are not necessarily sexually active. Sexually Transmitted Diseases. 1989;16: 173-177.

25. WHO. The sexual and reproductive health of young adolescents in developing countries. Geneva, Switzerland: WHO; 2011.

26. Hipwell AE, Keenan K, Loeber R, Battista D. Early predictors of sexually intimate behaviors in an urban sample of young girls. Developmental psychology. 2010;46: 366.

27. Kalamar AM, Bayer AM, Hindin MJ. Interventions to prevent sexually transmitted infections, including HIV, among young people in low- and middle-income countries: A systematic review of the published and gray literature. J Adolesc Health. 2016;59: S22-31.

28. Stockl H, Kalra N, Jacobi J, Watts C. Is early sexual debut a risk factor for HIV infection among women in sub-Saharan Africa? A systematic review. Am J Reprod Immunol. 2013;69 Suppl 1: 27-40.

29. UNICEF. For every child, end AIDS. New York, NY: UNICEF; 2016.

30. Looker KJ, Garnett GP, Schmid GP. An estimate of the global prevalence and incidence of herpes simplex virus type 2 infection. Bulletin of the World Health Organization. 2008;86: 805-812A.

31. Catino J. The health of vulnerable adolescent girls: A strategic investment for double return. 2012.

32. WHO. Comprehensive cervical cancer control: A guide to essential practice. Geneva, Switzerland: WHO; 2014.

33. UNFPA. Motherhood in Childhood. Facing the challenge of adolescent pregnancy. State of World Population 2013. New York: UNFPA; 2013.

34. Kothari M, Wang S, Head S, Abderrahim N. Trends in adolescent reproductive and sexual behaviors. DHS comparative reports. Calverston, MD, USA: ICF International; 2012.

35. Laski L, Wong S. Addressing diversity in adolescent sexual and reproductive health services. Int J Gynaecol Obstet. 2010;110 Suppl: S10-12.

36. Decker MR, Latimore AD, Yasutake S, Haviland M, Ahmed S, Blum RW, et al. Gender-based violence against adolescent and young adult women in low- and middle-income countries. J Adolesc Health. 2015;56: 188-196.

37. Heise L, Moore K, Toubia N, Council P. Sexual Coercion and Reproductive Health: A Focus on Research: Population Council;1995.

38. Moore AM, Madise N, Awusabo-Asare K. Unwanted sexual experiences among young men in four sub-Saharan African countries: Prevalence and context. Cult Health Sex. 2012;14: 1021-1035.

39. García-Moreno C. Global and regional estimates of violence against women: prevalence and health effects of intimate partner violence and non-partner sexual violence: World Health Organization;2013.

40. Varga CA. How gender roles influence sexual and reproductive health among South African adolescents. Stud Fam Plann. 2003;34: 160-172.

41. Jewkes R, Morrell R. Gender and sexuality: Emerging perspectives from the heterosexual epidemic in South Africa and implications for HIV risk and prevention. Journal of the International AIDS Society. 2010;13: 6.

42. McCree DH, Rompalo AM. Biological and behavioral risk factors associated with STDs/HIV in women: Implications for behavioral interventions. In: Aral SO, Douglas JM, editors. Behavioral Interventions for Prevention and Control of Sexually Transmitted Diseases. Boston, MA: Springer US; 2007: pp. 310-324.

43. Connell R. Gender and power: Society, the person and sexual politics: John Wiley & Sons;1987.

44. Pulerwitz J, Barker G, Segundo M, Nascimento M. Promoting more gender-equitable norms and behaviors among young men as an HIV/AIDS prevention strategy. *Horizons final report*. Washington, DC: Population Council; 2006.

45. Pleck JH, Sonenstein FL, Ku LC. Masculinity ideology: Its impact on adolescent males' heterosexual relationships. Journal of Social Issues. 1993;49: 11-29.

46. Barker G, Ricardo C. Young men and the construction of masculinity in Sub-Saharan Africa: Implications for HIV/AIDS, conflict, and violence. Washington, DC: World Bank; 2005.

47. Connell R. Gender, health and theory: Conceptualizing the issue, in local and world perspective. Soc Sci Med. 2012;74: 1675-1683.

48. Courtenay WH. Constructions of masculinity and their influence on men's well-being: A theory of gender and health. Social Science & Medicine. 2000;50: 1385-1401.

49. Kerrigan D, Andrinopoulos K, Chung SE, Glass B, Ellen J. Gender ideologies, socioeconomic opportunities, and HIV/STI-related vulnerability among female, African-American adolescents. J Urban Health. 2008;85: 717-726.

50. Dunkle KL, Jewkes RK, Brown HC, Gray GE, McIntryre JA, Harlow SD. Gender-based violence, relationship power, and risk of HIV infection in women attending antenatal clinics in South Africa. Lancet. 2004;363: 1415-1421.

51. Republic of Kenya. Available: http://www.republicofkenya.orgl

52. The World Bank. World Bank Open Data: Kenya Available: http://data.worldbank.org/country/kenyal

53. National Council for Population and Development UNFPA Kenya Country Office. Kenya Population Situation Analysis. Government of Kenya; 2013.

54. Kenya National Bureau of Statistics, Ministry of Health Kenya, National Aids Control Council Kenya, Kenya Medical Research Institute, National Council for Population and Development, UNFPA Kenya Country Office. Kenya Demographic and Health Survey 2014. Rockville, MD, USA; 2015.

55. UNDP. Human Development Reports: Kenya. Available: http://hdr.undp.org/en/countries/profiles/KENl

56. Beguy D, Kabiru CW, Zulu EM, Ezeh AC. Timing and sequencing of events marking the transition to adulthood in two informal settlements in Nairobi, Kenya. Journal of urban health. 2011;88 Suppl 2: S318-340.

57. Blum R. Youth in sub-Saharan Africa. Journal of adolescent health. 2007;41: 230-38.

58. Hussain R. Abortion and unintended pregnancy in Kenya. Issues Brief (Alan Guttmacher Inst). 2012: 1-4.

59. Kenya Ministry of Health, National AIDS Control Council. Kenya AIDS response progress report. 2016.

60. Ezeh A, Oyebode O, Satterthwaite D, Chen YF, Ndugwa R, Sartori J, et al. The history, geography, and sociology of slums and the health problems of people who live in slums. Lancet. 2016.

61. UN-Habitat. The challenge of slums: Global report on human settlements. 2003. Revised and updated verison (April 2010). London, UK: Earthscan Publications Ltz; 2010.

62. Mmari K, Aston N. Urban adolescent sexual and reproductive health in low-income and middle-income countries: Arch Dis Child. 2014;99(8): 778-82.

63. United Nations Department of Economic and Social Affairs PD. World urbanization prospects: The 2014 revision, highlights. United Nations Publications; 2014.

64. Mberu B, Mumah J, Kabiru C, Brinton J. Bringing sexual and reproductive health in the urban contexts to the forefront of the development agenda: The case for prioritizing the urban poor. Matern Child Health J. 2014;18: 1572-1577.

65. UN-Habitat. The State of African Cities 2014. Re-imagining sustainable urban transitions. . Nairobi, Kenya: UN-Habitat; 2014.

66. Lilford RJ, Oyebode O, Satterthwaite D, Melendez-Torres GJ, Chen YF, Mberu B, et al. Improving the health and welfare of people who live in slums. Lancet. 2016.

67. Clark S, Kabiru C, Mathur R. Relationship transitions among youth in urban Kenya. Journal of marriage and the family. 2010;72: 73-88.

68. World Economic Forum. The Global Gender Gap Report 2015. 10th anniversary edition. Geneva; 2015.

69. Buve A, Bishikwabo-Nsarhaza K, Mutangadura G. The spread and effect of HIV-1 infection in sub-Saharan Africa. Lancet. 2002;359: 2011-2017.

70. Social institutions and gender index. Kenya country profile. Available: http://www.genderindex.org/country/Kenyal

71. Beguy D, Mumah J, Wawire S, Muindi K, Gottschalk L, Kabiru C. Status report on the sexual and reproductive health of adolescents living in urban slums in Kenya. STEP UP technical working paper. Nairobi: African Population and Health Research Center; 2013.

72. Austrian K, Muthengi E, Riley T, Mumah J, Kabiru C, Abuya B. Adolescent Girls Initiative-Kenya baseline report. Nairobi: Population Council; 2015.

73. Marston M, Beguy D, Kabiru C, Cleland J. Predictors of sexual debut among young adolescents in Nairobi's informal settlements. Int Perspect Sex Reprod Health. 2013;39: 22-31.

74. De Mayer S, Kågesten A, Mmari K, McEachran J, Chilet E, Kabiru C, et al. “Boys should have the courage to ask a girl out”: Gender norms in early adolescent romantic relationships. Journal of Adolescent Health. Forthcoming 2017.

75. Burr V. Social constructionism. London and New York: Routledge;2015.

76. Simon W, Gagnon JH. Sexual scripts: Origins, influences and changes. Qualitative Sociology. 2003;26: 491-497.

77. Butler J. Gender trouble, feminist theory, and psychoanalytic discourse. Feminism/postmodernism. 1990: 324-340.

78. Ridgeway CL, Correll SJ. Unpacking the gender system: A theoretical perspective on gender beliefs and social relations. Gender & Society. 2004;18: 510-531.

79. Wingood GM, DiClemente RJ. Application of the Theory of Gender and Power to examine HIV-related exposures, risk factors, and effective interventions for women. Health Education & Behavior. 2000;27: 539-565.

80. Ajzen I. The theory of planned behavior. Organizational behavior and human decision processes. 1991;50: 179-211.

81. Bandura A. Human agency in social cognitive theory. American psychologist. 1989;44: 1175.

82. Bronfenbrenner U. Ecological systems theory. Annals of Child Development. 1989;6: 187-249.

Figure 1.1 Conceptual framework

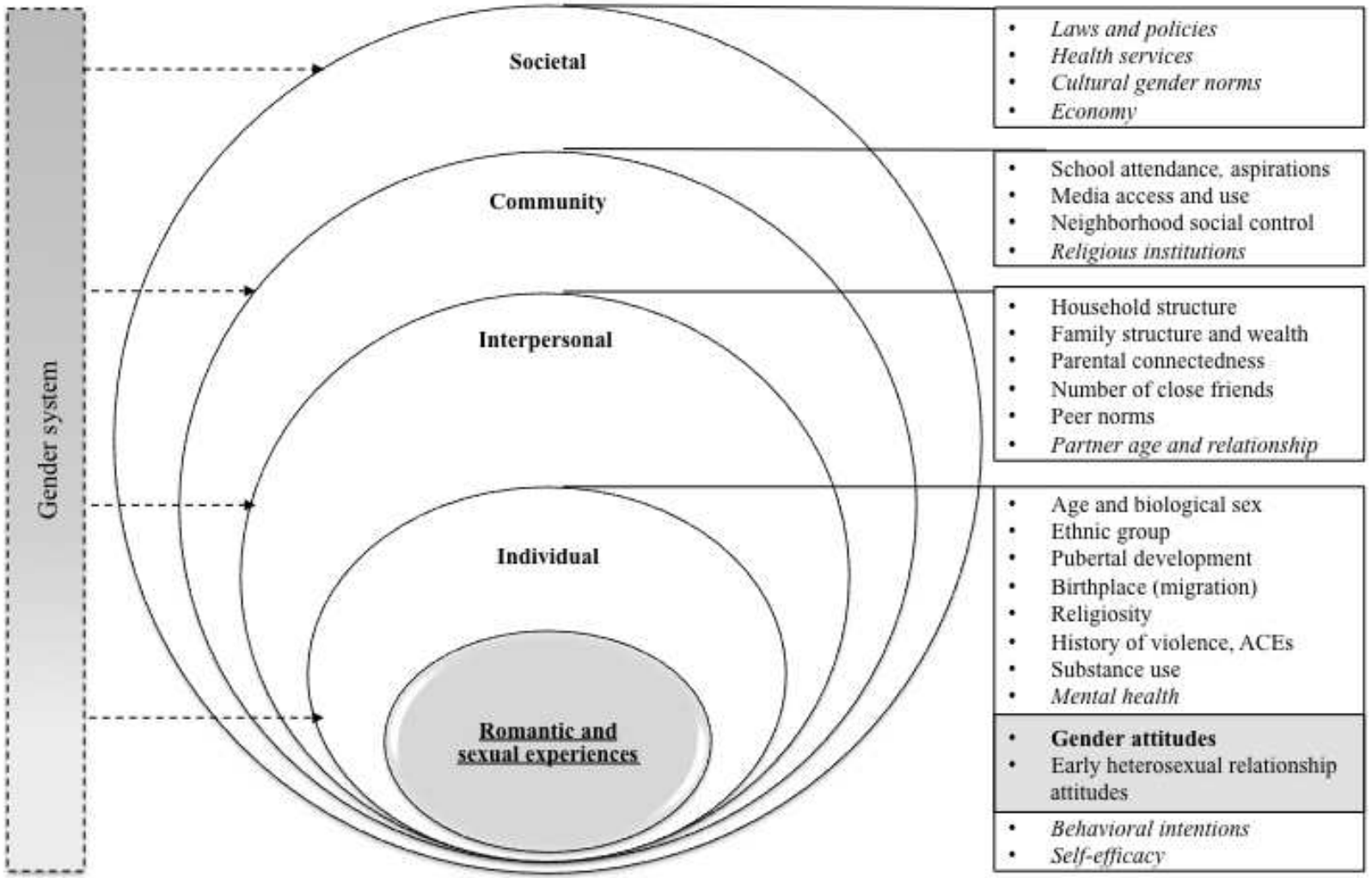
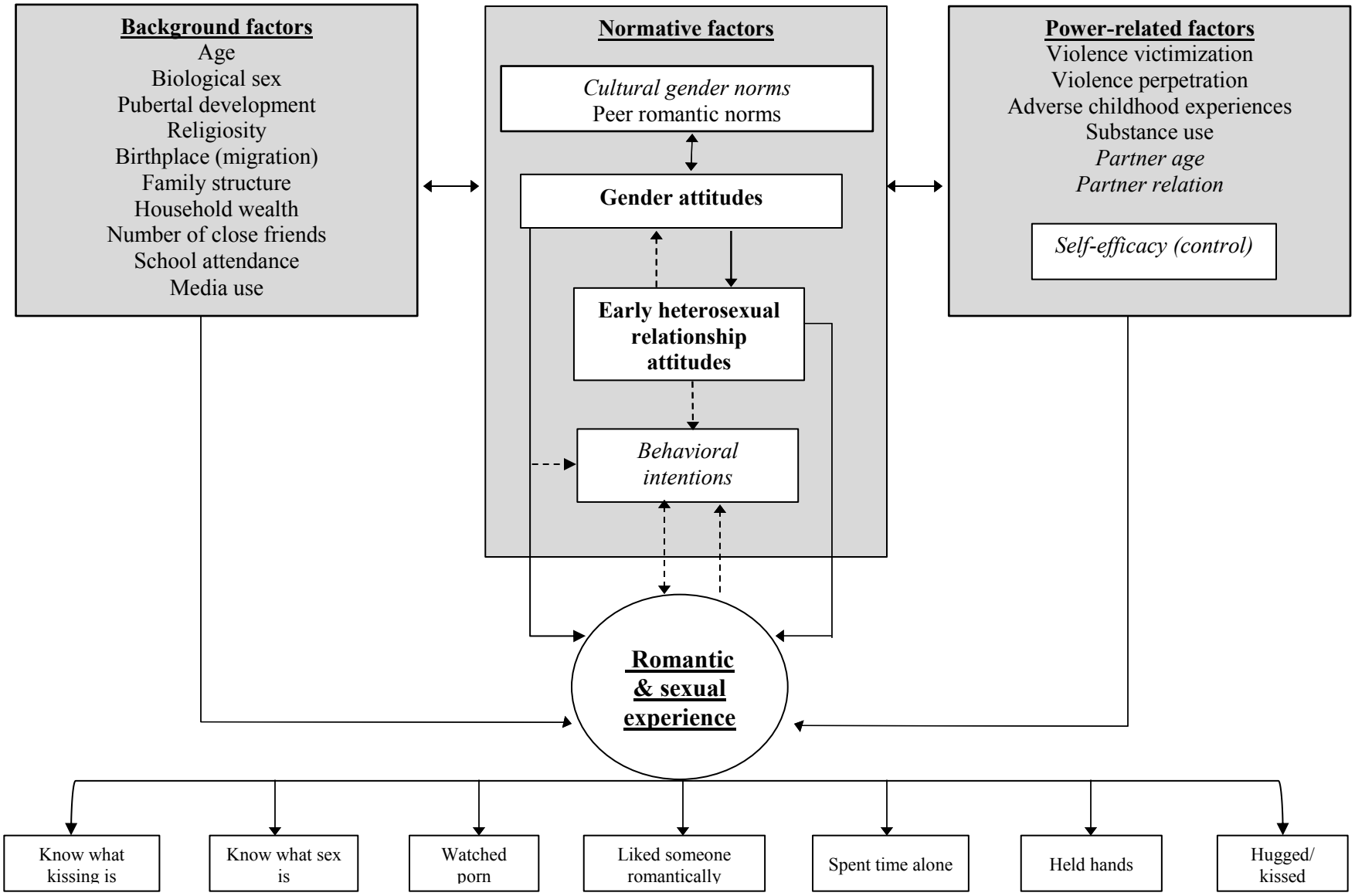


Figure 1.2 Analytical framework for Aim 3



Chapter 2 : Methods

THE GLOBAL EARLY ADOLESCENT STUDY

This dissertation is nested within the Global Early Adolescent Study (GEAS) and consists of a mixed-methods systematic review and a quantitative study. The GEAS is a multi-country study with the overall goal to understand how gender norms inform physical, mental and sexual and reproductive health in early adolescence. The study is led by the Department of Population, Family and Reproductive Health at Johns Hopkins Bloomberg School of Public Health (JHBSPH) in partnership with the WHO and includes 15 sites: Assiut (Egypt), Baltimore (USA), Blantyre (Malawi), Cape Town (South Africa), Cochabamba (Bolivia), Cuenca (Ecuador), Edinburgh (Scotland), Ghent (Belgium), Hanoi (Vietnam), Nairobi (Kenya), Ile-Ife (Nigeria), Kinshasa (DRC), New Delhi (India), Ouagadougou (Burkina Faso) and Shanghai (China). These sites were selected because they are home to urban poor adolescents and represent diverse cultural settings. The GEAS is jointly funded by the WHO, UNFPA, David and Lucile Packard Foundation, Bill and Melinda Gates Foundation, Ford Foundation and Save the Children. The GEAS has two phases. This dissertation is based on Phase 1, which started with qualitative interviews with 11-13 -year-olds and their parents/guardians (30 in each site) about transitions into adolescence and the formation of gender attitudes, followed by the development of new quantitative instruments to measure VYA gender attitudes, health and ecological-level correlates. These instruments were piloted through a survey with n=120 in each site; Nairobi included a lager sample for purposes of this dissertation.

SYSTEMATIC REVIEW

In Chapter 3, I report on a mixed-methods systematic review of factors that influence gender attitudes in early adolescence. PubMed, Psychinfo, MEDLINE, Scopus and eight

other databases indexing articles in the health, medical, social, educational and psychological sciences were searched from January 1984 to September 2014. Searches were built in three blocks, including: 1) population (e.g. adolescents, child, middle school) AND 2) outcome (e.g. gender attitudes or stereotypes), AND 3) influencing factors (e.g. parent influence, socialization). Included studies had to be peer-reviewed and explore one or more factors that shape or potentially influence personal gender attitudes among VYA aged 10-14 years. I led a team of two other students to review the titles and abstracts of studies in English, and to review the full-text in duplicate for studies that passed this initial screen. Two students assisted with the review of full-texts in Spanish, Portuguese, Japanese and Russian. We extracted data and assessed the quality of studies using standardized templates according to study design. Data were synthesized using a *segregated mixed-methods* approach. A segregated approach is especially relevant when quantitative and qualitative findings are viewed as complementary; addressing different research questions within the same domain of research (in this case, gender attitudes) but from different aspects. As explained by Sandelowsi [1] (pg. 7):

> *Quantitative findings indicate **that-knowledge** (e.g., that being female and being African American led to lower levels of adherence in comparison to being male or being white), while qualitative findings indicate **why-knowledge** or the gender or race performances or relations that might explain these observations.*

For example, while quantitative studies might show variations in gender attitudes across different factors, qualitative studies help us understand why such variations might occur. I thus formulated two different research questions for the synthesis of quantitative (*what* factors appear to be associated with gender attitudes?) and qualitative (*how* do young adolescents construct and negotiate gender attitudes?) studies, and subsequently

integrated everything for a final synthesis. The synthesis and the methods for assessing the robustness of review findings are described in detail in Manuscript I (Chapter 3).

QUANTITATIVE STUDY

Study site

The quantitative study took place in Korogocho, one of the most congested slums in Nairobi with a population of around 200,000 people. Korogocho was selected as study setting because of its large urban poor population, representing diverse ethnic and religious communities, and because an established sampling frame exist – the Nairobi Urban Health and Demographic Surveillance System (NUHDSS) [2] - that allows to sample a representative population of VYA. The NUHDSS was established by the implementing partner of the GEAS in Nairobi, the African Population and Health Center (APHRC), and covers a population of 75,000 individuals living in over 25,000 households in two urban slums. In 2013, the NUHDSS had a total estimated population of 31,784 in Korogocho of which 10% were aged 10-14 years. Located about 12 kilometers from Nairobi's city center, Korogocho has a total area of 0.52 km^2 spanning over seven villages. Each village is inhabited by members of different ethnic groups, the main groups being Kikuyu (34%); Luo (26%); Luhya (18%); Kamba (7%); Garre (6%), Borana (3%) and Somali (3%). While the population is relatively stable and most residents have lived there for many years, the rate of migration in and out of Korogocho is still fairly high. It is one of the most congested Nairobi slums with over 250 dwelling units per hectare. Most houses in are made of mud and timber with roofs of flattened tin cans, typically built in rows with about six units per structure [2]. Like other slums in Nairobi, Korogocho is characterized by high levels of crime, social and physical

insecurity, unemployment and overcrowding coupled by limited social services, education, water and sanitation. Causal employment is the main livelihood [2,3].

Research team

Headquartered in Nairobi, the pan-African research organization APHRC has over 15 years of history in adolescent SRH research and extensive experience interviewing younger and older adolescents in slums. APHRC is well suited as a partner because of their access to a representative sampling frame for Korogocho as well as their data collection and methodological capacities. Their established partnerships in Korogocho also allowed us to seek input from and collaborate with community stakeholders during data collection. Our research team consisted of the local PI and field coordinator, a data manager and 20 data collectors as described below. Our work was highly collaborative: we held weekly meetings to discuss the planning and implementation of data collection, and had regular teleconferences with the GEAS coordinating center at JHBSPH.

Sample and sampling

Sample size estimation for Latent class analysis (LCA) – the main method for Aims 2 and 3 – is complex as there is no close-ended formula. Previous studies has recommended an *N* of at least 300-500 to fit models with sufficient power [4]. I evaluated this recommendation by running a series of Monte Carlo Simulations in line with the approach introduced by Dzinak et al [4]. Results from the simulations indicated that it is possible to fit a 3-class latent class model with 80% power using a sample size of n=400 (see Appendix 2.2 for details). Anticipating a non-response rate of at least 20%, a target sample of n=500 was determined and inflated to n=550.

Participants were selected using the NUHDSS May 2015 enumeration list to identify adolescents who would be aged 10-14 years between December 1, 2015 and February 29, 2016. A list of 3,042 10-14 years olds residing in the 7 different villages of Korogocho was obtained. This list was first stratified by age and sex, and simple random sampling was used to select equal numbers of adolescents within each stratum for a sample of n=550 (10 groups of n=55, e.g. boys 10-years, girls 10-years, boys 11 years, girls 11 years). However as the fieldwork began, we experienced challenges in interviewing 10-year-olds who had evident difficulties understanding the questions; interviews took about four hours to complete with these youngest participants. We therefore decided to terminate the recruitment of 10-year-olds (n=43 had already been interviewed) although we still interviewed those who had prior parental consent and provided their own assent to participate (n=15). In order to retain the analytical power, we re-drew an additional sample of 80 adolescents. Our final sample list therefore consisted of 630 10-14-year-olds, out of whom we were able to locate and interview 424. For purposes of this dissertation all 10-year-olds were dropped and analyses were restricted to 11-14-year-olds (n=504). Out of these, 67 had moved out of the NUHDSS or the households could not be located (despite repeat attempts to contact these) and 1 adolescent had died, leaving an eligible sample of 436. Of those 16.1% did not provide parental or individual assent (n=31) or were otherwise not available for interview (n=39 travelled *up-country* for the holidays or were at boarding school). Refusal rates did not vary by age or sex. In total 366 respondents aged 11-14 years whose parents consented and who themselves assented were interviewed for an actual response rate of 84%

(366/436). One respondent was dropped from the current analyses because of poor data quality (described below) for a final analytical sample of 365 (Figure 2.2).

The GEAS survey

The GEAS survey was developed through a collaborative, iterative prcoess with all study sites. The survey in Kenya was thus driven by decisions made by the entire GEAS team, although there were also site-specific questions. The survey includes 10 health core modules: 1) Sociodemographics; 2) Family; 3) Peers; 4) School; 5) Neighborhood perceptions; 6) Media; 7) Physical health and development; 8) Mental health and violence: 9) Romantic and sexual relations (optional by site); and 10) Empowerment.[1] Items were derived primarily from existing surveys of adolescents such as the Transitions to Adulthood Study (Kenya) [5], the National Longitudinal Study on Adolescent Health (US) [6], the Health Behavior of School age Children (Europe) [7] and the Well-Being of Adolescents in Vulnerable Environments study (global) [8]. In addition, the survey included a series of statements to assess gender attitudes as described below.

Data collection procedures

All measures in the survey were piloted for face-validity during August-September 2015 with a purposive sample of 10-14 years (n=20) in each site. Adolescents were asked individually about which questions were not understandable or should be deleted and/or modified, and the survey was revised in line with their suggestions.

We began data collection in Nairobi in November 2015 and concluded in February 2016. We administered the survey using mobile computer-assisted personal

[1] The 10 health modules of the GEAS survey that was used for the Nairobi data collection (over 40 pages long) is available for download here: http://tinyurl.com/j4ba7gk

interviewing, which facilitated the direct upload of data so that no additional input was needed. It also allowed us to use skip-patterns and gradually build up questions so that the most sensitive questions were only asked if relevant. We used android tablets pre-programmed with the SurveyCTO (Version 2.12) platform that is based on the Open Data Kit technology [9]. Each data collector was given a password-protected tablet loaded with a household roster form (for parents/guardians) and a survey form (for adolescents).

Adolescents were recruited and interviewed through a multi-step process. We worked with local tracers (someone who is familiar with the different villages of Korogocho and conversant with the NUHDSS procedures) to identify each selected household. At the household, the data collectors explained the study goals and procedures to the parent/guardian, and if they consented they were also asked to complete a brief household roster covering the parental age, employment and education. If the parent/guardian allowed the adolescent to participate, the field workers described the study purpose along with anticipated risks and benefits to the adolescent and invited him/her to come to a local school for the interview. Each adolescent received a link-card, containing a unique identification number and their interview date; and were asked to bring this card with them. These cards were used to identify the adolescents at the school and link their records with the parental household roster.

All interviews began with the data collector confirming consent and assent. The data collector subsequently read each question aloud to the respondent and entered their responses into the tablet. They worked closely with the youngest participants and those who needed more assistance by providing clarification and sharing the tablet screen. Interviews were conudcted in Swahili or English by same-sex data collectors.

Training and survey pre-test

We trained 20 data collectors (9 male, 11 female) during two sessions in November and December 2015. The data collectors were selected based on their experience working with and/or interviewing young adolescents in the slums, education (training in social work, teaching or similar), age (younger than 35 years), experience using mobile data collection, and knowledge of Swahili and the local slang. Two of the data collectors were assigned as team-leaders to supervise the rest of the team and conduct spot-checks.

The training spanned five days, of which the first two covered study background, ethics and instrument content, followed by two days devoted to the mobile platform, mock interviewing, and practice with young adolescents in the field. Nairobi was the first of 15 GEAS sites to start data collection. During the training, we went back and forth to revise the wording and flow of questions, and fix technical bugs in the platform. When we pre-tested the survey, it took about four hours to administer with adolescents who were interviewed in their households, and many failed to complete the survey because of respondent fatigue. We therefore eliminated or simplified the wording of several questions, and introduced response cards for Likert-typed questions which allowed the adolescents to point to different colors associated with their agreement (e.g. green for "agree a lot") rather than reading these out aloud. We also decided not to conduct the interviews in the households, but to bring groups of adolescents to a secure central venue – a local school – in order to increase the privacy and ease of administration.

Ethical considerations

The GEAS received ethical approval from the JHBSPH Institutional Review Board, the WHO Ethical Review Board, and the AMREF Ethical and Scientific Review Committee

for Kenya. Prior to the start of the fieldwork, we held a meeting with the Community Advisory Committee in Korogocho to sensitize community members on the study purpose and obtain their approval to conduct the study. As noted earlier VYA were only included if they provided their own assent and parental consent to participate in the study.

The risks associated with the current study were mainly of psychosocial nature; it is possible that participants experienced distress and embarrassment as a result from the inimate nature of some questions. Prior to survey administration, the field workers reminded participants that they did not have to answer any questions that they felt uncomfortable with and that they could skip questions, take a break or stop the interview without negative consequences. Following each interview standardized questions were used to screen for respondent distress by asking the respondents how they were feeling. The majority of respondents reported feeling "very good" (71%) or "ok" (28.5%) with no difference by age; no one reported abuse. The data collectors were however extensively trained to respond to handle adverse events should these occur. All participants were provided with an information sheet listing contact details of local youth centers, clinics and other support services. To minimize the burden of time required for participation, adolescents were provided a hot meal for lunch and additional snacks. While there were no direct benefits to individual participants, it is possible that participation helped inform them about the social and physical changes they are experiencing, and enhanced their comfort in discussing sexual and relationship issues.

All data were kept confidential and anonymous, and no identifiers were collected or stored. Data were uploaded daily to an electronic database managed by SurveyCTO

where all data files were maintained in a secure, password-protected server. Computer checks for gross inconsistencies were used to alert investigators to potential irregularities.

Measures

Dependent variables

A series of dependent variables related to romantic and sexual experiences were included, as shown in Table 2.1. The survey was designed to minimize the sensitive nature of asking VYA about sexuality by first asking respondents about romantic activities (e.g. ever liked someone as more than just friends) followed by questions about whether they know of different sexual activities. If the respondents indicated affirmatively they were asked whether they knew any friends who ever engaged in each activity. This was followed by questions about respondent's own lifetime participation in a range of different sexual activities, all beginning with "Have you ever….". Lifetime participation was chosen over past-year experiences in order to capture low frequency behaviors. Dichotomous variables were created for each activity, coded as 1 if the respondent reported "yes", and 0 if "no". Questions did not reference heterosexual relations; rather, respondents were asked to specify the sex of the person (boy, girl) that they had each romantic or sexual experience with (except for vaginal sex). If respondents indicated that they have never heard about vaginal sex or engaged in any non-coital activity they were not asked about ever having had vaginal sex. For the most physically intimate behaviors (fondling, oral sex, vaginal sex), respondents were also asked about the timing (age), relationship to and relative age of partner, and wantedness at initiation. Those reporting vaginal sex were also asked about contraceptive use and alcohol use at initiation.

***Latent class indicators**:* I selected seven indicator variables to develop the key outcome variable, a latent class typology of romantic and sexual experiences:

- KNOW_KISS (know what kissing is)
- KNOW_SEX (know what sexual intercourse is)
- PORN (ever watched pornography)
- BGF_LIKEDB (liked someone as more than friends, they liked you back)
- SEX_TIME (spent time in a private space with someone without adults)
- SEX_HANDS (held hands)
- SEX_HK (hugged/cuddled or kissed)

These variables were selected based on: 1) theory and past research; 2) recommendations to use fewer indicators with smaller sample sizes; and 3) distribution of response patterns (excluding indicators with very low prevalence or high covariance with other indicators) [10]. I initially intended to use a wider range of indicators including fondling, oral and vaginal sex, sequencing of sexual behavior (e.g. linear vs. non-linear progression from less to more intimate behaviors) as well as expectations to have sex. However, due to the very low proportion reporting fondling/oral/vaginal sex these could not be included in the LCA; and it was not possible to estimate differences in the timing of activities. The question related to sexual intentions was omitted due to a survey error.

Key independent variable: gender and early heterosexual relationship attitudes

For Aim 3a, I developed scales to measure domains of gender attitudes as related to sexuality and sexual relationships. The GEAS survey contained a total of 124 items hypothesized to represent different constructs of dominant masculinity (60 items) and femininity norms (64 items). These items were grounded in the qualitative data collected from VYA and their parents. Following the coding of the in-depth interviews across sites, codes related to gender norms were extracted and analyzed to generate a universe of items. For this dissertation, I explored 28 items related to attitudes about boys' sexuality

and relationships and 36 items related to attitudes about girls sexuality (Appendix 2.3). The selection of items was guided by theory and the systematic review (Chapter 3), which together highlight the existence of gendered sexual double standard norms.

A 5-point likert scale was used to measure the degree of agreement to each item, with higher values representing higher *disagreement*. For the current analysis, the coding was reversed so that higher values represent higher *agreement* (5=agree a lot, 4=agree a little, 3=neither agree, nor disagree, 2=disagree a little, 1=disagree a lot).

Scale development: I first conducted two separate principal component analyses (PCA) with the selected masculinity and femininity items, followed by exploratory factor analysis (EFA) with oblique rotation to gain a more detailed understanding of the underlying structure. After determining the initial number of factors to extract using eigenvalues and scree tests, I re-ran the program and removed items with *very* low loadings (0.35) and high uniqueness (>0.80). Finally, I conducted a series of separate EFAs for each factor, this time retaining items with loadings over 0.4. I also evaluated the conceptual meaningfulness of items, and removed repetitive items [11]. The models used a polychoric correlation matrix, which have been found to be a better method than a Pearson matrix when using ordinal indicators [12]. For the same reason, a polychoric matrix was used to estimate the reliability of each scale through *ordinal alpha* [13].

Missing values were estimated for each scale and replaced with the mean of the remaining items for respondents missing less than half of scale items (<2% of respondents) [14]. Composite scores for each scale were then calculated by summarizing and taking the mean of all items. The PCA, EFA and alpha calculations were all performed using the *Psych* package in RStudio Studio [15]. The replacement of missing

values and calculation of final scale scores were conducted in Stata version 12.1 [16]. While the sample size was sufficient to conduct EFA [11], it was not large enough to conduct confirmatory factor analysis.

Factors identified: For **masculinity norms**, the results indicated that 3-4 factors should be retained. Because only 2 items loaded on the last factor (fewer than the recommended minimum) [17], 3 factors were chosen: *acceptance of very young adolescent (VYA) boys having girlfriends* (M1), *male sexual prowess* (M2), and *male sexual responsibility* (M3). While M3 and M1 items loaded together in a 2-factor solution, the loadings were weak indicating distinct constructs. For the items related to **femininity norms**, the results indicated that 3 factors should be retained. As some items cross-loaded on F2 and F3, a 2-factor solution was selected: *acceptability of VYA girls having boyfriends* (F1) and *female sexual risk* (F2) (Appendix 2.4).

The factors were further refined through separate EFAs as shown in Table 2.2. Because responses to items in factors M1 and F1 were similar (indicating low permissiveness towards early relationships irrespective of sex), I conducted an EFA that merged these into an overall construct of *early heterosexual relationships*. Items referring to sexual relations were removed because they did not fit conceptually with the construct of VYA boys and girls spending time together in relationships. In fact, almost all items in M1 and F1 started with "It's ok for a boy/girl to…", which can help explain why these items loaded together even though they appeared to be conceptually different [11].

For the *female sexual risk* factor, 5 items were removed because of their low loadings and high uniqueness, and 8 items were kept. For the *male sexual prowess* factor, 2 items were removed due to low loadings and repetitive nature for a total of 6 items.

Further analysis revealed that these two factors formed a sexual double standard scale with two sub-scales; however, I used the sub-scales rather than the full scale in order to assess the unique influence of masculinity and femininity attitudes. Lastly, one item with low loading was removed from the *male sexual responsibility* factor for a total of 3 items.

Final scales: Table 2.3 shows the weighted mean value and standard deviation for each of the four scales used in Chapter 5, including: 1) *female sexual risk, 2) male sexual prowess*, 3) *male sexual responsibility*, and 4) *early heterosexual relationship attitudes.* Table 2.4 shows the ordinal alpha [13] by age and sex. All scales had ordinal alphas above 0.70, which while not particularly high is considered acceptable reliability [11]. As shown by the histograms in Figures 2.3–2.6, none of the scales followed a standard normal distribution, which is typically the case for Likert scales where respondents tend to either disagree or agree [18]. Given the skewed distributions, I also created dichotomous variables for each scale based on the sex-specific distribution of the scores among boys and girls, to reflect low ($<50^{th}$ percentile) and high ($\geq 50^{th}$ percentile) agreement. For example, high agreement with male sexual prowess among boys reflected those with the most stereotypical attitudes relative to the distribution among boys.

Covariates

I included a number of covariates based on the conceptual framework (Appendix 2.6). *Age* was measured discretely in single years and further dichotomized into age groups (11-12 vs. 13-14 years). *Biological sex* (male/boy, female/girl)[2] was pre-programmed into the survey based on the sampling frame and confirmed through the question "Are you a boy or a girl?". *Pubertal development* was assessed using questions on the onset of

[2] While an individual's biological sex may or may not align with their gender identity (which was not assessed in the survey), I use the terms male and female interchangeably with boy and girl for purposes of simplicity.

menstruation or breast development for girls and onset of genital growth, hair growth and/or voice change for boys. An additional measure tapped perceived *body change relative to peers* (about the same, faster, slower). Two variables measured *religion* (Catholic, Protestant, Other Christian, Muslim, no religion) and *religiosity*, i.e. perceived importance of religion in life (low vs. high). Respondents were also asked whether they were *born in the slum settlement* (no, yes) and their *ethnic group* (Kikuyu, Lou, Luhya, Borana, Kamba, Somali, Other).

Household size was assessed through a dichotomous variable reflecting the number of people living the household in addition to the respondent (1-5, ≥6 people), and the *number of people sleeping in the same room* was measured categorically (alone or one more person, 2-3 other people, ≥ 4 other people). *Relative household wealth* was measured through an index derived from the availability of 15 assets in the household (e.g. electricity, indoor running water, car/truck, cell phone, TV) [19,20]. The index was constructed by first computing standardized weighted scores using PCA, and subsequently summarizing these scores to create relative scores according to wealth tertiles (poorest third, middle and least poor thirds) (Cronbach's alpha =0.64).
A dichotomized variable assessed *family structure* (both parents alive, single/double orphan). Other family variables included whether *parents live together* (yes, no), *parental connectedness* (feel that mother and father, respectively, care a lot, somewhat, or not at all,) and *age and sex of siblings* (none, younger or older brothers and sisters, respectively).

A dichotomous variable assessed *school enrollment* (yes, no), and a categorical variable to tapped the *number of school days missed during the past month* (none, 1-2,

≥3, not enrolled in school). Respondents also reported their current *school grade* (Primary grades 1-8, Secondary forms 1-2), and together with current age this information was used to create a categorical variable reflecting *grade for age* (at expected level or ahead, 1-2 grades behind, 3 or more grade behind). In addition, *educational aspirations* measured how far the respondent think s/he will go in school (complete primary/secondary, complete college/university). A 5-item scale was used to measure *perceived neighborhood social control* by asking respondents how likely their neighbors would be to intervene if people were damaging property, spraying graffiti, bullying others, fighting, and engaging in illegal activities (not at all, somewhat or very likely). The scale ranged from 0-10 and was categorized based on percentiles into low (25^{th}), moderate (50^{th}) and high (75^{th}) perceived social control (Cronbach's alpha=0.78)

Chapter 5 added other potential correlates of gender attitudes as well as romantic/sexual experiences, including: *media use,* i.e. the number of hours of media use on a typical day (none, 1-2 hours, ≥3 hours), *number of close friends* (none/one[3], 2-3, ≥4) and *peer romantic norms*, measured through the question "How many of your close friends think it is important to have boy/girlfriends?" (none/few, some/all). In addition, *adverse childhood experiences (ACEs)* were measured through 13 questions on the respondent's lifetime exposure to various types of abuse and household dysfunctions (never, sometimes, often). In order to allow for meaningful analysis of the experiences (some had low prevalence), the adverse events are organized into seven categories in line with previous studies [21-23]: emotional abuse or neglect (5 questions), sexual abuse (2 questions), parental substance abuse, parental mental health issues, intimate partner

[3] Only three respondents reported having no close friends and were therefore merged with those reporting one close friend.

violence in the home, parental criminal behavior (1 question respectively), and economic adversity (2 questions). Respondents were coded as having experienced a category if they responded "sometimes" or "often" to one or more of the questions. The categories were summarized to create an ACE score variable ranging from 0 to 7, and further grouped into 0, 1, 2, vs. 3 or more categories of adverse experiences. Finally, two variables assessed lifetime *victimization of physical violence* ("Have you ever been slapped, hit or otherwise been physically hurt by a boy or a girl in a way that you did not want?") and *perpetration of physical violence* ("Have you ever slapped, hit or otherwise physically hurt a boy or a girl in a way they did not want?). Respondents were asked to specify the sex of the person that the violence occurred with (boy, girl, both boys and girls). Because very few respondents reported violence to or from someone of the opposite sex (9 boys, 5 girls), these responses were collapsed with violence in relation to *both* boys and girls resulting in create three categories (never, opposite/both sexes, same sex only).

Data cleaning

I cleaned the full dataset by checking for errors and inconsistences, and dropped one respondent with low quality responses, defined as meeting two of the following criteria: 1) missing more than half of all questions asked by all respondents; 2) answered over half of gender norm scales and/or questions related to romantic and sexual experiences with "refuse" or "do not know"; 3) flagged as "very bad" by the interviewer on two or more screening questions. As can be seen in Table 2.5, most respondents irrespective of age were judged by the data collectors to have had good cooperation, accurate answers, good understanding of questions, and to have concentrated during the interviews.

I also recoded inconsistent romantic and sexual responses (Table 2.6). First, those responding to be married or engaged (n=28) due to an interviewer misunderstanding were recoded as 0. Secondly, respondents indicated that they "never did that" when asked about the age at initiation of a sexual behavior that they had previously indicated having experienced (n=20) were recoded as "never" for that activity. Additionally, 3 boys responded "yes" to ever being in relationship, spending time alone, holding hands or hugging with *another boy*, but "no" to ever liking a boy as more than friends, and were consequently recoded as not having done these activities. The same was true for 20 girls in relation to other girls. Despite efforts to clarify that these referred to romantic activities done with a someone "as more than just friends", some respondents likely interpreted questions as being about platonic relations. One boy and 2 girls consistently reported liking someone of the same sex *and* that they engaged in same-sex non-coital activities.

Missing data

Table 2.7 provides an overview of the missing data and the replacement procedures. An exploration of the missing data patterns showed that most observations were missing as a result of the different skip-patterns employed in the survey (for example, 151 boys and 161 girls were not asked about whether they had vaginal sex). Because of the design, it is reasonable to assume that these variables were not relevant to the respondent at time of survey. Missing data due to refusals/don't know ranged from 0.3% (spent time alone) to 2.7% (know what kissing is) for outcomes, and from 0.5% to 2% for independent variables. A sensitivity analysis indicated no differences by age, sex or sexual experience when missing data were coded into the lowest or highest reference groups (e.g. 0 vs. 1). There were no differences when comparing sociodemographic characteristics of those 1)

missing because of skip patterns, 2) responding "no" to the question, or 3) refusals/don't know answers for each applicable variable; and no differences in significance when missing values were treated as 0 and when they were excluded. All missing values on binary and categorical variables were therefore coded as 0.

Descriptive and bivariate analyses

Exploratory data analysis was used to check the distribution and normality of variables along with potential outliers using histograms and boxplots. Proportions were calculated for categorical and dichotomous variables, while means (standard deviations) and median (IQR) were calculated for continuous variables. Survey weights were calculated for each age/sex strata to reflect the probability of: 1) selection from the NUDHSS population (i.e. design weight); 2) eligiblility/recruited for interview; and 3) response, and multiplied into a final weight. Weights were normalized (by dividing the raw weights by their mean) in order to match with the population size and generate correct estimates.

Bivariate analyses including cross-tabulations and means comparisons were conducted to determine the association between covariates and the outcomes. For Chapter 4, weighted prevalence estimates were calculated for each outcome variable. Because very few reported romantic or sexual activities, statistical comparisons by sex were not possible. The median age at initiation of sexual activities was estimated using survival analysis, which allows taking into account the age of all respondents by censoring respondents who reported never engaging in behaviors at their current (survey) age [24].

For Chapter 5, the non-parametric Mann Whitney-*U* test and Kruskal-Wallis test was used to assess differences in mean ranks of the gender and relationship attitude scales given the skewed distributions. Differences in the weighted proportion with high versus

low agreement on each scale were assessed using Pearson's chi-square statistic. I evaluated the association between gender attitudes and ER attitudes by using the dichotomous measure of the latter in logistic regression models, by sex.

All statistical analyses except for the LCA, which used MPlus version 7 [25], were implemented using Stata version 12.0 [16]. Significant relationships were assessed at the two-sided $\alpha = 0.05$ level; however, given the relatively small sample size I also highlighted borderline significant findings at the $p<0.1$ level.

Latent class analysis

LCA is a sub-set of structural equation modeling in which binary or categorical indicators are clustered into categorical latent (unobserved) variables. The goal of LCA is to identify unique subgroups, or *classes*, of individuals who have similar item response patterns across a spectrum of different indicators [10,26] – in this case romantic and sexual experiences. LCA is generally considered superior to traditional cluster-based approaches because it uses statistical probability models rather than algorithms to identify sub-groups. The method has been used to study various topics across social, psychological, public health, medical and behavioral sciences [10,26,27]. While LCA is similar to factor analysis, LCA uses categorical variables with multinomial distribution (in contrast to continuous, normal distribution) [10]. It is a *person-centered analysis approach*, meaning that the goal is to identify subtypes of individuals based on patterns of individual characteristics [28]. This is fundamentally different from variable-centered approaches (that underlie construction of scales) where the goal is to identify relationships between variables, assumed to apply across all respondents [10,28].

The LCA measurement model is depicted in Figure 2.7. It is expected that the indicator variables ($X_{1...i}$) measure *k* mutually exclusive and exhaustive latent classes (*L)* (prevalence sum up to 1). Each of the indicator variables has associated error components ($e_{1...i}$), and one of the benefits of LCA is that it is possible to adjust for this error. The model estimates two parameters [10] (Appendix 2.7): 1) *latent class probability* (η), i.e. the proportion of respondents that falls into each class, and 2) *item response probability* (π), the conditional probability of reporting an indicator given membership in class *L*.

I developed the LCA model through several iterative steps. Contingency tables were used to display the number of different responses patterns. Next, I fitted a series of models with increasing number of classes and relied on several model selection criteria. Absolute model fit, whether the model fits the data, was evaluated using the Likelihood ratio (X^2) and Pearson's chi-square (G^2) goodness of fit statistics, with $p<0.05$ indicating lack of model fit. Relative model fit, i.e. which model has the optimal number of classes, was assessed through the Akaike's Information Criteria (AIC), the Bayesian Information Criteria (BIC) and the sample size adjusted BIC (ssBIC) where smaller values indicate better model fit. I also examined the Lo-Mendel-Rubin likelihood-ratio test, with $p<0.05$ indicating that a model with more classes fits better than one with fewer classes. The quality of classification into classes was evaluated by whether the probability of class membership was high for one class (and low on others), and by the Entropy statistic where larger numbers indicate less error [10]. Model selection was also based on the interpretability of classes, excluding solutions with low class prevalence (<5%) as such groups tend to be less meaningful.

LCA assumes local independence, that the indicator variables in each latent class are independent and only connected through the latent variable [10]. I evaluated this assumption by checking whether the standardized bivariate residuals were significant; none of the residuals exceed 1.96 wherefore local independence could be assumed [29]. I also evaluated differential measurement for boys and girls by regressing each of the latent class indicators on sex, and class membership on sex [30]. There was no association between sex and each of the indicators, and the effect did not vary across classes, indicating that the same model applied to both boys and girls. Participants were assigned to modal classes based on their highest posterior probability (probability of belonging to a class given a response pattern) in order to show the distribution of other romantic and sexual experiences across the different groups.

Latent class regression

I used latent class regression (LCR) to evaluate associations between class membership and covariates. LCR adds a structural piece to the measurement model, and can be conducted by using what is referred to as a *one-step* or a *three-step approach*.

For Chapter 4, I used the one-step approach in which the indicator variables and covariates are entered together to estimate the latent class model and simultaneously predict class membership in relation to covariates, thereby reducing measurement error [10]. This approach is generally considered standard as long as the assumption about local independence holds, entropy is relatively high (>0.6), and the addition of covariates does not shift the most likely class membership [31]. I first conducted bivariate regressions for each covariate and calculated the predicted probability of class membership by biological sex and age (Appendix 2.7). Covariates were then added one at

the time into an adjusted model. Modal class assignment shifted less than 5% in the adjusted model compared to the null model, indicating that the addition of covariates did not substantially change the measurement model. The model was specified using the following equations (with three latent classes, two equations are needed):

$$\log\left[\frac{\Pr(L_i=1\,|x_{i1},x_{i2})}{\Pr(L_i=3\,|x_{i1},x_{i2})}\right] = \beta_{01} + \beta_{11}x_{i1} + \beta_{21}x_{i2} + \cdots \beta_{i1}x_i \qquad \textbf{Equation 1}$$

$$\log\left[\frac{\Pr(L_i=2\,|x_{i1},x_{i2})}{\Pr(L_i=3\,|x_{i1},x_{i2})}\right] = \beta_{02} + \beta_{12}x_{i1} + \beta_{22}x_{i2} + \cdots \beta_{i2}x_i \qquad \textbf{Equation 2}$$

Let x_{i1} = 1 if girl, 0 if boy. Holding everything else constant:

$e^{\beta_{11}}$ = OR for membership in class 1 vs. class 3 for girls compared to boys.

$e^{\beta_{12}}$ = OR for membership in class 2 vs. class 3 for girls compared to boys.

$\frac{e^{\beta_{11}}}{e^{\beta_{12}}} = e^{\beta_{11}-\beta_{12}}$ = OR for membership in class 1 vs. class 2 for girls compared to boys.

In the context of a larger number of predictors, the one-step approach carries certain disadvantages. As highlighted by Vermunt [32], the measurement and prediction model needs to be re-estimated each time a new covariate is added or removed and with small samples the model might fail because of the larger number of parameters estimated [31,32]. In order to integrate additional covariates including the gender and relationships scales, and to conduct stratified analyses by sex, the LCR model for Chapter 5 was therefore developed using a three-step approach. The three-step approach assigns individuals to modal classes that are used for further analysis. While doing so produces biased estimates and downwards the association between covariates and class membership [32], recent modifications has made it possible to correct the standard errors and similar results as the one-step approach [31,32]. I used Vermunt's corrected three-step approach [32] based on the Mplus code provided by Asparouhov and Muthén [31]. In the first step, the LCA model was estimated using only the indicator variables. Next, a

nominal variable *N* for most likely class membership was created together with the classification uncertainty rate for *N* (e.g., the probability of being in class 1 given modal class 3) based on the measurement model obtained in step 1. Third, the auxiliary model was implemented using *N* (modal class) as the only latent class indicator while taking into account its measurement error by fixing the uncertainty rates obtained in step 2 [31,32]. Each of the scales were first regressed on class membership, followed by the addition of covariates in blocks into a series of adjusted models:

Model 1: gender/relationship attitudes

Model 2: gender/relationship attitudes + background factors

Model 3: gender/relationship attitudes + background factors + peer norms

Model 4: gender/relationship attitudes + background factors + peer norms + violence + ACEs

Because the pathways and effects of gender attitudes on romantic and sexual experiences may differ between boys and girls, I explored interaction terms between sex with and with each scale. None of the interaction terms were significant. I also attempted to fit separate models for boys and girls; however when doing so many parameters had wide CIs and some failed to converge, most likely due to the lack of power in the stratified models. The multinomial LCR model for Aim 3c estimates the aOR and 95% CI of modal class membership in relation to covariates using the following equations:

$$\log\left[\frac{\Pr(L_i=1\,|x_{i1},x_{i2})}{\Pr(L_i=3\,|x_{i1},x_{i2})}\right] = \beta_{01} + \beta_{11}earlyrel + \beta_{21}femsexrisk + \beta_{31}mascsexprow + \beta_{41}mascsexresp + \beta_{51}age + \beta_{61}gender + \beta_{71}age{\times}gender + \beta_{81}puberty + \beta_{91}birthplace + \beta_{101}orphan + \beta_{111}hhsize + \beta_{121}wealth3 + \beta_{131}religious + \beta_{141}peernorm + \beta_{151}violenceperp + +\beta_{161}aces \quad \textbf{Equation 3}$$

$$\log\left[\frac{\Pr(L_i=2\,|x_{i1},x_{i2})}{\Pr(L_i=3\,|x_{i1},x_{i2})}\right] = \beta_{02} + \beta_{12}earlyrel + \beta_{22}femsexrisk + \beta_{32}mascsexprow +$$

$$\beta_{42}mascsexresp + \beta_{52}age + \beta_{62}gender + \beta_{72}age{\times}gender + \beta_{82}puberty + \quad \textbf{Equation 4}$$

$$\beta_{92}birthplace + \beta_{102}orphan + \beta_{112}hhsize + \beta_{122}wealth3 + \beta_{132}religious +$$

$$\beta_{142}peernorm + \beta_{152}violenceperp + +\beta_{162}aces$$

Holding everything else constant:

$e^{\beta_{11}VYArelnorm}$ = OR for membership in class 1 vs. 3 for each unit increase in scale

$e^{\beta_{12}VYArelnorm}$ = OR for membership in class 2 vs. class 3 for each unit increase in the scale

$\frac{e^{\beta_{11}VYArelnorm}}{e^{\beta_{12}VYArelnorm}} = e^{\beta_{11}VYArelnorm - \beta_{12}VYArelnorm}$ = OR for membership in class 1 vs. class 2 for each unit increase in the scale

CHAPTER 2 REFERENCES

1. Sandelowski M, Barroso J, Voils CI. Using qualitative metasummary to synthesize qualitative and quantitative descriptive findings. Res Nurs Health. 2007;30: 99-111.

2. Emina J, Beguy D, Zulu EM, Ezeh AC, Muindi K, Elung'ata P, et al. Monitoring of health and demographic outcomes in poor urban settlements: Evidence from the Nairobi Urban Health and Demographic Surveillance System. Journal of Urban Health. 2011;88: 200-218.

3. Kabiru CW, Beguy D, Ndugwa RP, Zulu EM, Jessor R. "Making it": Understanding adolescent resilience in two informal settlements (slums) in Nairobi, Kenya. Child Youth Serv. 2012;33.

4. Dziak JJ, Lanza ST, Tan X. Effect size, statistical power and sample size requirements for the bootstrap likelihood ratio test in latent class analysis. Structural equation modeling. 2014;21: 534-552.

5. Beguy D, Mumah J, Wawire S, Muindi K, Gottschalk L, Kabiru C. Status report on the sexual and reproductive health of adolescents living in urban slums in Kenya. STEP UP technical working paper. Nairobi: African Population and Health Research Center; 2013.

6. Carolina Population Center. The national longitudinal study of adolescent to adult health (Add Health). Available: http://www.cpc.unc.edu/projects/addhealthl

7. Currie C. Social determinants of health and well-being among young people. Copenhagen, Denmark: World Health Organization Regional Office for Europe 2012.

8. Decker MR, Marshall BD, Emerson M, Kalamar A, Covarrubias L, Astone N, et al. Respondent-driven sampling for an adolescent health study in vulnerable urban settings: A multi-country study. Journal of Adolescent Health. 2014;55: S6-S12.

9. Dobility Inc (2016) SurveyCTO [Technology for digital data collection]. Cambridge, MA.

10. Collins LM, Lanza ST. Latent class and latent transition analysis: With applications in the social, behavioral, and health sciences. Hoboken, NJ: John Wiley & Sons;2010.

11. DeVellis R. Scale development. Theory and applications. California: Sage Publications, Inc;2003.

12. Holgado–Tello FP, Chacón–Moscoso S, Barbero–García I, Vila–Abad E. Polychoric versus Pearson correlations in exploratory and confirmatory factor analysis of ordinal variables. Quality & Quantity. 2008;44: 153.

13. Gadermann AM, Guhn M, Zumbo BD. Estimating ordinal reliability for Likert-type and ordinal item response data: A conceptual, empirical, and practical guide. Practical Assessment, Research & Evaluation. 2012;17: 1-13.

14. Downey RG, King C. Missing data in Likert ratings: A comparison of replacement methods. J Gen Psychol. 1998;125: 175-191.

15. RStudio Team (2015) RStudio: Integrated Development for R. Boston, MA: RStudio, Inc.

16. StataCorp (2011) Stata Statistical Software: Release 12. College Station, TX: StataCorp LP.

17. Osborne JW, Costello AB. Best practices in exploratory factor analysis: Four recommendations for getting the most from your analysis. Pan-Pacific Management Review. 2009;12: 131-146.

18. Sullivan GM, Artino AR. Analyzing and interpreting data From Likert-type scales. Journal of Graduate Medical Education. 2013;5: 541-542.

19. Ndugwa RP, Kabiru CW, Cleland J, Beguy D, Egondi T, Zulu EM, et al. Adolescent problem behavior in Nairobi's informal settlements: Applying problem behavior theory in sub-Saharan Africa. J Urban Health. 2011;88 Suppl 2: S298-317.

20. Biney AAE, Dodoo FN-A. What are the characteristics of 'sexually ready' adolescents? Exploring the sexual readiness of youth in urban poor Accra. BMC Public Health. 2016;16: 1-11.

21. Felitti VJ, Anda RF, Nordenberg D, Williamson DF, Spitz AM, Edwards V, et al. Relationship of childhood abuse and household dysfunction to many of the leading causes of death in adults. The Adverse Childhood Experiences (ACE) Study. Am J Prev Med. 1998;14: 245-258.

22. Hillis SD, Anda RF, Felitti VJ, Marchbanks PA. Adverse childhood experiences and sexual risk behaviors in women: A retrospective cohort study. Fam Plann Perspect. 2001;33: 206-211.

23. Salawu MM, Owoaje E. Adverse childhood experiences and smoking among urban touths in Oyo State, south western Nigeria. Online Journal of Public Health Informatics. 2014;6: e9.

24. Zaba B, Pisani E, Slaymaker E, Boerma JT. Age at first sex: Understanding recent trends in African demographic surveys. Sexually Transmitted Infections. 2004;80: ii28-ii35.

25. Muthén BO, Muthén LK (1998-2015) MPlus. 7th ed.

26. von Eye A. Developing the person-oriented approach: Theory and methods of analysis. Development and Psychopathology. 2010;22: 277-285.

27. German D, Latkin CA. Social stability and health: Exploring multidimensional social disadvantage. J Urban Health. 2012;89: 19-35.

28. Bergman LR, Magnusson D. A person-oriented approach in research on developmental psychopathology. Dev Psychopathol. 1997;9: 291-319.

29. Oberski DL, van Kollenburg GH, Vermunt JK. A Monte Carlo evaluation of three methods to detect local dependence in binary data latent class models. Advances in Data Analysis and Classification. 2013;7: 267-279.

30. Muthén LK, Muthén BO (1998-2015) MPlus User's Guide. Seventh Edition. Los Angeles, CA: Muthén & Muthén.

31. Asparouhov T, Muthén B. Auxiliary variables in mixture modeling: Three-step approaches using Mplus. Structural Equation Modeling. 2014;21: 329-341.

32. Vermunt JK. Latent class modeling with covariates: Two improved three-step approaches. Political Analysis. 2010;18: 450-469.

Figure 2.1 Map of Korogocho

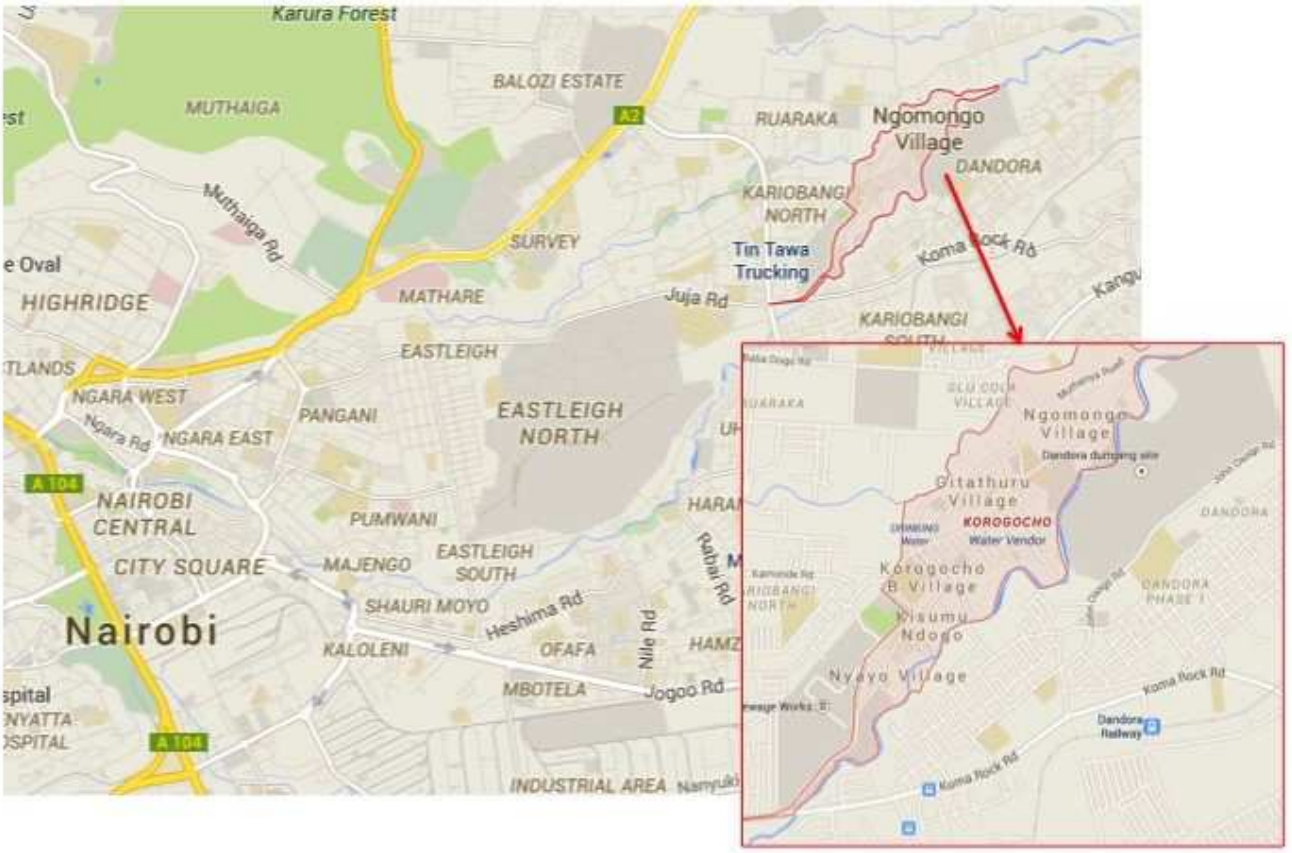


Figure 2.2 Overview of the sampling and recruitment process

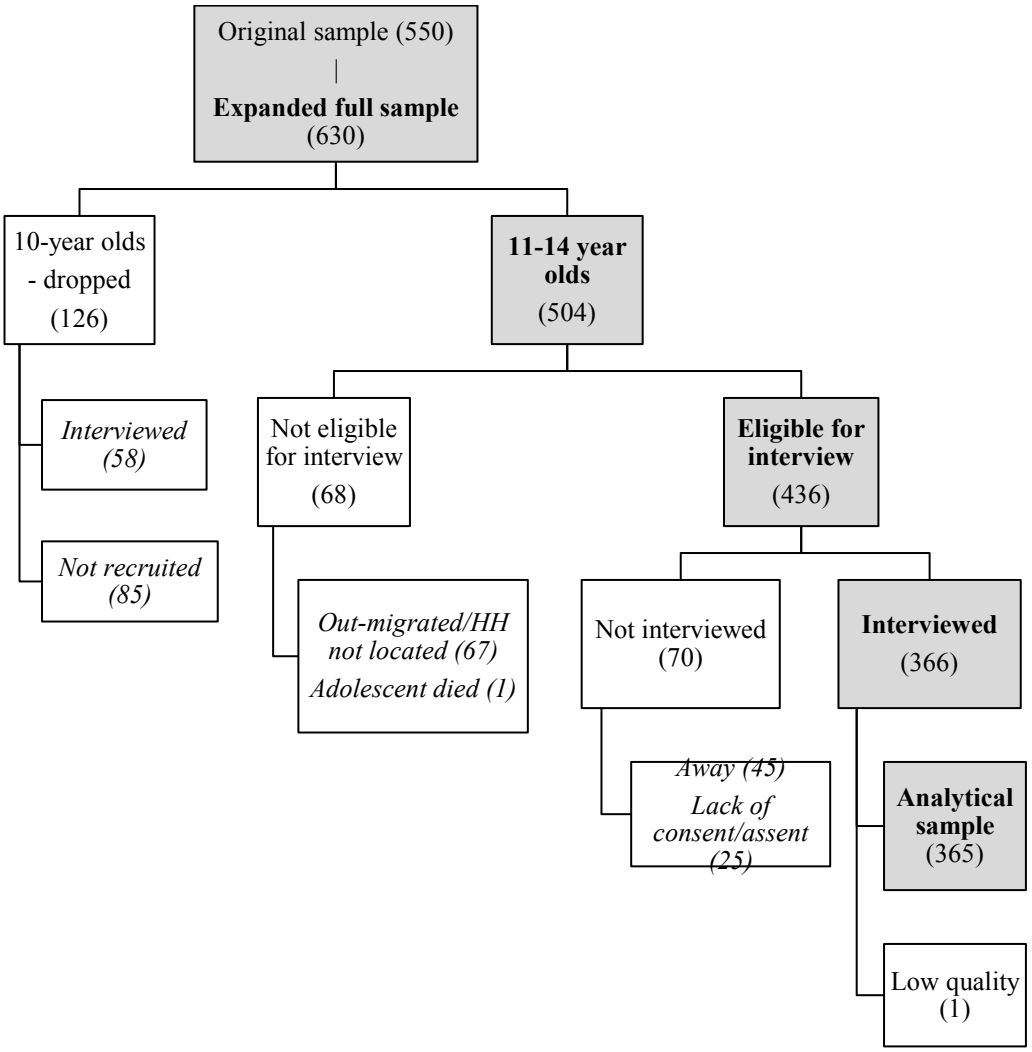


Figure 2.3 Histograms of early relationship attitude scale scores, by sex

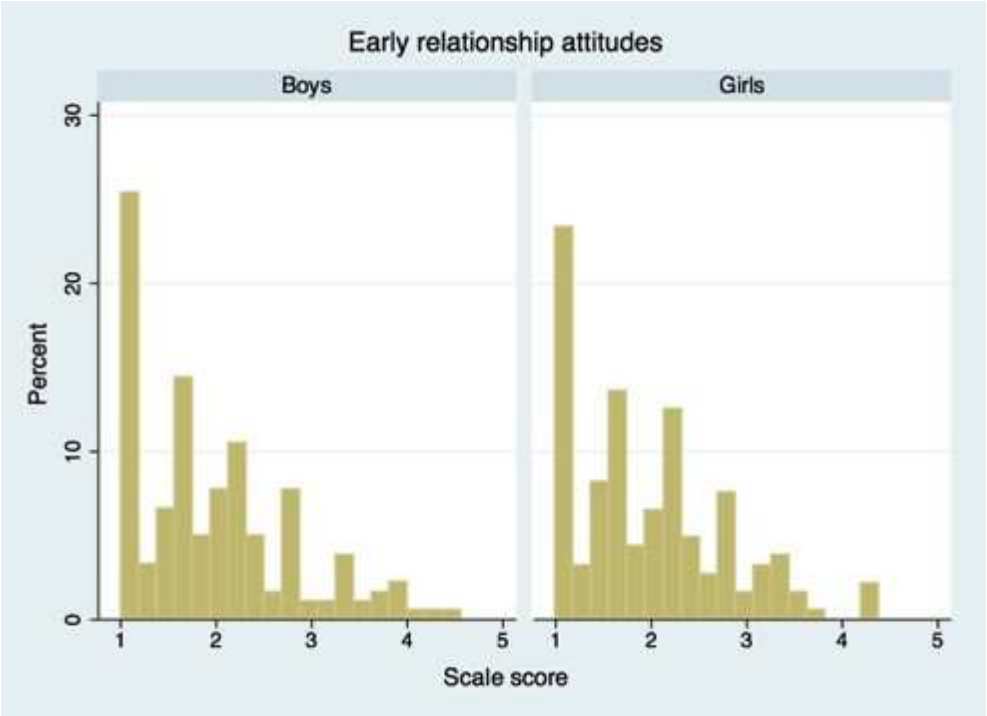


Figure 2.4 Histograms of female sexual risk/shaming scale scores, by sex

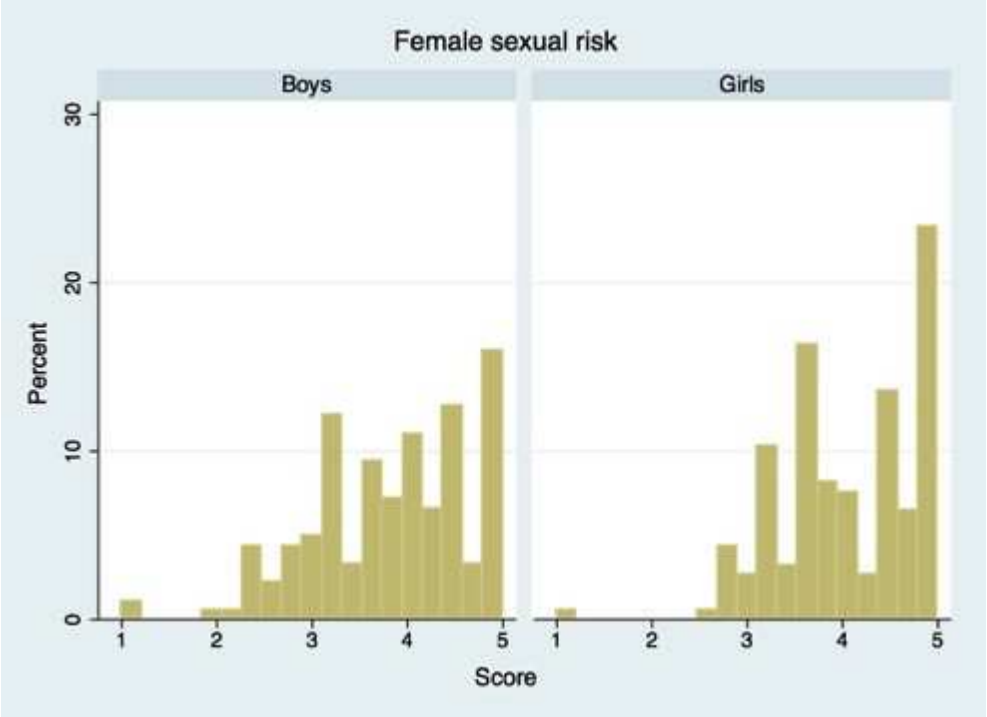


Figure 2.5 Histograms of male sexual prowess scale scores, by sex

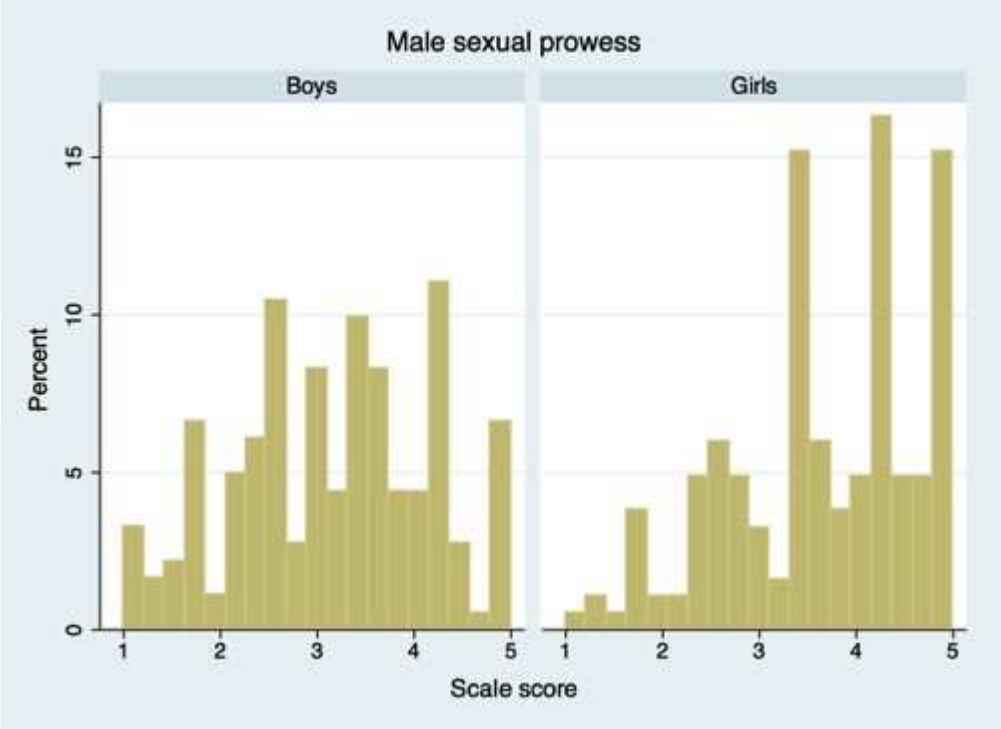


Figure 2.6 Histograms of male sexual responsibility scale scores, by sex

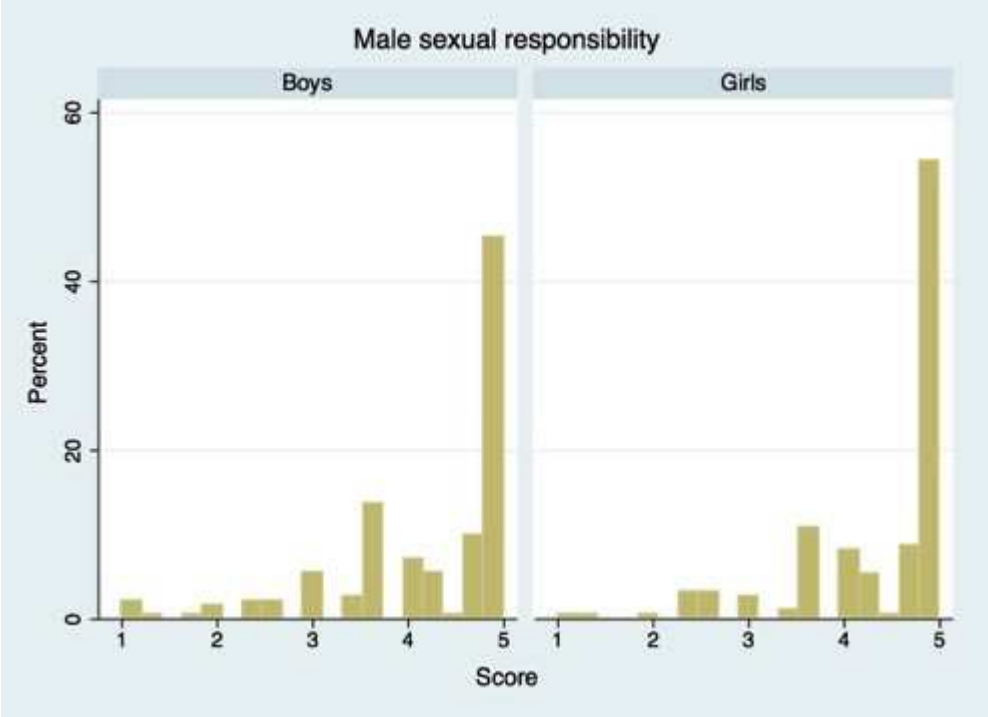


Figure 2.7 Latent class measurement model

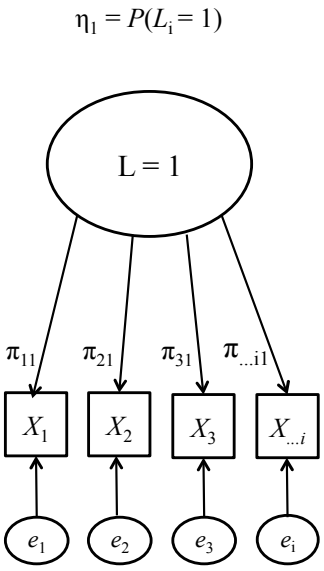


Table 2.1 Overview of dependent variables

Variable	**Measurement**	**Analysis**
KNOW_KISS Know what kissing is	Dichotomous 0=no,1=yes	Descriptive LCA, LCR Chapters 5-6
KNOW_SEX Know what sexual intercourse is	Dichotomous 0=no,1=yes	Descriptive LCA, LCR Chapters 5-6
PORN Ever watched pornography	Dichotomous 0=no,1=yes	Descriptive LCA, LCR Chapters 5-6
BGF_LIKED Ever liked someone as more than friends	Dichotomous 0=no,1=yes	Descriptive Chapter 5
BGF_LIKEDB Ever liked someone as more than friends, the person liked you back	Dichotomous 0=no,1=yes	Descriptive LCA, LCR Chapters 5-6
REL_STATUS Current relationship status	Categorical 0=Not in a relationship 1=Boyfriend 2=girlfriend 3= ≥ 1 partner	Descriptive Chapter 5
SEX_TIME Ever spent time in a private space with someone without adults	Dichotomous 0=no,1=yes	Descriptive LCA, LCR Chapters 5-6
SEX_HANDS Ever held hands	Dichotomous 0=no,1=yes	Descriptive LCA, LCR Chapters 5-6
SEX_HUG Ever hugged/cuddled	Dichotomous 0=no,1=yes	Descriptive Chapter 5
SEX_KISS	Dichotomous	Descriptive

Ever kissed on lips/with tongue	0=no,1=yes	Chapter 5
SEX_HK Ever hugged/cuddled or kissed	Dichotomous 0=no,1=yes	Descriptive LCA, LCR Chapters 5-6
SEX_MEDIA Ever sexted/flirted using media	Dichotomous 0=no,1=yes	Descriptive Chapter 5
SEX_F Ever fondled/touched private parts	Dichotomous 0=no,1=yes	Descriptive Chapter 5
SEX_O Ever had oral sex (mouth on genitals)	Dichotomous 0=no,1=yes	Descriptive Chapter 5
SEX_V Ever had vaginal sex (penis in vagina)	Dichotomous 0=no,1=yes	Descriptive Chapter 5
SEX_ANY Ever engaged in any non-coital or coital activity.	0=no,1=yes	Descriptive Chapter 5
SEX_NRC Nr of different sexual behaviors ever engaged in	Categorical 0=None 1=1 type 2=2-3 types 3=4 types	Descriptive Chapter 5
SEX_MIN Age at first sexual behavior	Median years (IQR)	Descriptive Chapter 5
SEX_DIFF Time between 1st and 2nd sexual behavior	Dichotomous 0=same year 1= ≥ 1 year	Descriptive Chapter 5
WILL_FONDLE Willingness first time fondled	Dichotomous 0=Not willing at all 1=Very/somewhat willing	Descriptive Chapter 5
WILL_ORAL Willingness first oral sex	Dichotomous 0=no,1=yes	Descriptive Chapter 5
WILL_VAG Willingness first vaginal sex	Dichotomous 0=no,1=yes	Descriptive Chapter 5
SEX_LOVE Love or curiosity	Dichotomous 0=no,1=yes	Descriptive Chapter 5
SEX_PEER Peer pressure	Dichotomous 0=no,1=yes	Descriptive Chapter 5
SEX_PARTNERPRESS Felt obliged to partner	Dichotomous 0=no,1=yes	Descriptive Chapter 5
SEX_THREAT Threated, person insisted/would not take a ”no”	Dichotomous 0=no,1=yes	Descriptive Chapter 5
SEX_MONEY Promises of money or gifts)	Dichotomous 0=no,1=yes	Descriptive Chapter 5
SEX_FORCE Physically forced	Dichotomous 0=no,1=yes	Descriptive Chapter 5
VAG_REL Relationshipt and age of partner at first vaginal sex	Categorical 0=Same age boy/girlfriend 1= Older boy/girlfriend 2=Other same-aged partner 3=Mother/father	Descriptive Chapter 5
VAG_CONTRA Contracptive use (condom or other method) at first vaginal sex	Dichotomous 0=no,1=yes	Descriptive Chapter 5
VAG_ALCOHOL Under the influence of alcohol at first vaginal sex	Dichotomous 0=no,1=yes	Descriptive Chapter 5

Table 2.2 Refined gender and sexual relationship attitude scale item loadings

Construct	Item	Initial factor		Refined		Refined	
		Load	Uniq	Load	Uniq	Load	Uniq
Masculinity norms							
M1. Acceptance of VYA boys having girlfriends	37. BOYRELGIRL	0.72	0.48	0.69	0.52	0.62	0.62
	20. BOYMANYGF1	0.68	0.54	0.66	0.57	0.83	0.32
	36. BOYTIMEGIRL	0.45	0.8	0.5	0.75	0.41	0.83
	57. BOYSEXOLDER	0.55	0.7	0.59	0.66	–	–
	19. BOYATTRGIRL	0.36	0.87	–	–	–	–
	39. BOYMANYGF2	0.61	0.63	–	–	–	–
M2. Male sexual prowess	59. BOYFOOLSEX	0.63	0.6	0.67	0.55		
	44. BOYCOMPETE	0.65	0.58	0.66	0.56		
	45. BOYLIKESEXY	0.66	0.56	0.66	0.56		
	58. BOYBORED	0.62	0.62	0.66	0.57		
	33. BOYPLAYGIRL	0.61	0.63	0.57	0.68		
	31. BOYSHOWOFF	0.54	0.7	0.49	0.76		
	32. BOYPRESSURE	0.44	0.81	–	–		
	34. BOYNOLOVE	0.5	0.75	–	–		
M3. Male sexual responsibility	53. BOYPREGNO	0.61	0.63	0.68	0.54		
	52. BOYPROVIDE	0.66	0.57	0.84	0.83		
	60. BOYPREGRESP	0.88	0.23	0.63	0.61		
	35. BOYLOVEGF	0.34	0.88	–	–		
Femininity norms							
F1. Acceptance of VYA girls having boyfriends	44. GIRLRELBOY	0.75	0.43	0.74	0.45	0.76	0.58
	43. GIRLTIMEBOY	0.6	0.64	0.61	0.63	0.62	0.61
	51. GIRLSTUDYFIRST	0.57	0.67	0.58	0.66	0.57	0.68
	55. GIRLBFNORMAL	0.49	0.76	0.45	0.8	0.47	0.78
	59. GIRLSEXNOPREG	0.53	0.72	0.55	0.7	–	–
	63. GIRLSEXOLDER	0.58	0.67	0.6	0.64	–	–
	46. GIRLMANYBF	0.39	0.85	–	–	–	–
F2. Female sexual risk	32. GIRLSEDUCE	0.64	0.59	0.64	0.59	0.58	0.66
	30. GIRLNOSEDUCE	0.53	0.72	0.55	0.7	0.61	0.66
	64. GIRLTRICKED	0.56	0.69	0.55	0.7	0.57	0.67
	62. GIRLDUMPED	0.55	0.7	0.53	0.72	0.53	0.72
	41. GIRLGIFTS	0.51	0.74	0.52	0.73	0.52	0.73
	48. GIRLTROUBLE	0.5	0.75	0.49	0.76	0.47	0.78
	36. GIRLPROTECT	0.43	0.82	0.42	0.82	0.45	0.79
	42. GIRLIGNORE	0.4	0.84	0.39	0.81	–	–

	49. GIRLBAD	0.4	0.84	0.39	0.84	–	–
	57. GIRLPREGOK	0.39	0.82	–	–	–	–
	34. GIRLWATCH	0.38	0.85	–	–	–	–
	40. GIRLTORMENT	0.35	0.87	–	–	–	–
Merged constructs							
Early heterosexual relationships	44. GIRLRELBOY	0.73	0.46	0.77	0.41		
	55. GIRLBFNORMAL	0.49	0.76	0.51	0.74		
	36. BOYTIMEGIRL	0.67	0.55	0.67	0.55		
	37. BOYRELGIRL	0.55	0.7	0.55	0.69		
	43. GIRLTIMEBOY	0.63	0.61	0.63	0.61		
	51. GIRLSTUDYFIRST	0.5	0.75	0.52	0.73		
	20. BOYMANYGF1	0.52	0.73	0.57	0.68		
	59. GIRLSEXNOPREG	0.55	0.69	–	–		
	63. GIRLSEXOLDER	0.62	0.62	–	–		
	57. BOYSEXOLDER	0.67	0.55	–	–		
Sexual double standard	30. GIRLNOSEDUCE	0.54	0.71				
	32. GIRLSEDUCE	0.54	0.71				
	36. GIRLPROTECT	0.41	0.79				
	41. GIRLGIFTS	0.45	0.80				
	48. GIRLTROUBLE	0.41	0.79				
	62. GIRLDUMPED	0.57	0.68				
	64. GIRLTRICKED	0.64	0.60				
	31. BOYSHOWOFF	0.46	0.78				
	33. BOYPLAYGIRL	0.51	0.74				
	44. BOYCOMPETE	0.66	0.57				
	45. BOYLIKESEXY	0.58	0.66				
	58. BOYBORED	0.64	0.60				
	59. BOYFOOLSEX	0.73	0.46				

Note: Missing values were imputed by using individual mean of remaining scale items for respondents missing less than 50% of items.

Table 2.3 Summary of final gender and sexual relationship attitude scales

Nr	Item	Item score		Scale score*		
		Obs	Mean	Range	Mean (SD)	Loading
Female sexual risk				1–5	3.95 (0.79)	
32	Girls wear short dresses to get boys' attention	365	3.84			0.58
30	Girls should be careful about the way they look so as not to attract boys	364	4.02			0.61
64	Girls should avoid boys because they trick them into having sex	364	3.88			0.57
62	If a girl says "no" to sex her boyfriend will dump her	364	3.40			0.53
41	A girl might get a boyfriend because she wants money or gifts	364	3.84			0.52
48	Girls often get into "trouble" when they have boyfriends	365	4.22			0.47
36	Girls should protect their reputation above anything else	364	4.48			0.45
Male sexual prowess				1–5	3.41 (0.53)	
31	Boys have girlfriends to show off to their friends	361	3.02			0.76
33	Boys have girlfriends for fun more than love	361	3.08			0.68
44	Boys generally compete for the prettiest girls	363	4.00			0.56
45	Boys like girls who wear revealing clothes	365	3.24			0.56
58	Boys lose interest in a girl after they have sex with her	361	3.25			0.57
59	Boys fool girls into having sex	362	3.86			0.55
Male sexual responsibility				1–5	4.32 (0.93)	
52	Boys should not have sexual intercourse until they can provide for a family	364	4.28			0.83
53	Boys should be careful not to get a girl pregnant	364	4.48			0.54
60	A boy should take responsibility if he gets a girl pregnant	364	4.20			0.61
Early heterosexual relationships				1–4.6	1.94 (0.82)	
36	It's ok for a boy your age to talk and spend time with a girl alone	365	1.91			0.55
37	It's ok for a boy your age to be in a relationship with a girl as more than friends	365	1.72			0.69
39	It is ok for a boy to have more than one girlfriend at a time	365	1.54			0.68
43	It is ok for a girl and boy your age to talk and spend time together alone	365	2.28			0.61
44	It is ok for a girl your age to be in a relationship with a boy as more than friends	364	1.72			0.41
55	It's normal for a girl to want a boyfriend at your age	363	1.88			0.74
51	A girl can have a boyfriend as long as she continues working well in school	364	2.56			0.73

*Higher scores indicate greater agreement with each construct

Table 2.4 Internal consistency for the gender and sexual relationship attitude scales

Scale	All	Boys	Girls	11-12 years	13-14 years
Early heterosexual relationships	0.80	0.82	0.79	0.79	0.81
Female sexual risk	0.73	0.77	0.70	0.73	0.75
Male sexual prowess	0.79	0.78	0.77	0.79	0.78
Male sexual responsibility	0.76	0.77	0.76	0.79	0.75

Table 2.5 Interviewer assessment of the interview process

	11-12 years	13-14 years	Total
Respondent cooperation			
Very good	63.3%	67.8%	65.4%
Moderate (ok)	35.6%	32.2%	34.0%
Bad	1.2%	0.0%	0.6%
Truthfulness/accurateness of answers			
Very accurate/true	48.6%	56.0%	52.1%
Somewhat accurate/true	45.9%	39.6%	42.9%
Not very accurate/true	5.6%	4.4%	5.0%
Understanding of questions			
Very good (understood perfectly)	48.2%	58.1%	52.9%
Moderate (understood ok)	47.3%	38.9%	43.3%
Bad (did not understand many of the questions)	3.9%	3.0%	3.5%
Very bad (did not understand at all)	0.6%	0.0%	0.3%
Concentration and attentiveness			
Very good (highly concentrated/attentive)	59.2%	64.7%	61.8%
Moderate (somewhat concentrated/attentive)	38.0%	35.3%	36.7%
Bad (could not concentrate for many parts)	2.8%	0.0%	1.5%

Table 2.6 Inconsistent responses and recoded variables

	Original	Recoded as 0	Revised n
Married	26	26	0
Engaged	2	2	0
In a relationship (collapsed)	69	38	31
Spent time alone	40	9	31
Held hands	49	9	40
Hugged	36	3	33
Kissed	10	0	0
Sexual media	18	5	13
Fondled	11	2	9
Vaginal sex	8	0	0
Oral sex	3	0	0

Table 2.7 Missing data and procedures for replacement

Variable	Missing items			Procedure for handling missing data
	Skip pattern	Refused	Don't know	
Know what kissing is		1 girl	3 boys, 6 girls	Coded as 0 (no)
Know what sex is		1 girl, 1 boy	1 boy, 3 girls	
Liked someone		1 girl	1 boy, 1 girl	
Liked someone, they liked you back	144 boys, 158 girls		2 boys, 1 girl	
Relationship status*		10 boys, 9 girls	6 girls	
Spent time alone with someone		1 girl		
Held hands			2 girls	
Hugged/cuddled		2 girls	1 girl	
Media flirt/sexted*		2 girls	2 boys, 1 girl	
Kissed	48 boys, 53 girls	2 girls	1 girl	
Fondled	154 boys, 165 girls			
Oral sex	143 boys, 154 girls		1 boy	
Vaginal sex	151 boys, 161 girls		1 boy	
Born in Korogocho			2 boys, 6 girls	
Wealth index			1 boy	
Nr of brothers			1 boy	
Started puberty		2 boys, 3 girls	3 boys, 2 girls	
Relative body change		1 boy	4 boys, 4 girls	
Days missed at school			5 boys, 3 girls	
Media use (daily)			1 boy	
Violence victimization		1 girl		
Violence perpetration		1 girl		
Neighborhood social control (scale)		1 boy, 5 girls	13 boys, 14 girls	Replaced with mean of remaining items in scale
VYA relationship norm (scale)		7 boys, 4 girls missing <50% of scale items		
Female sexual risk (scale)		6 boys, 8 girls missing <50% of scale items		
Male sexual prowess (scale)		14 boys, 9 girls missing <50% of scale items		
Male sexual responsibility (scale)		8 boys, 5 girls missing <50% of scale items		

*Collapsed variables

Chapter 3 (Manuscript I) :

Understanding factors that shape gender attitudes in early adolescence globally: A mixed-methods systematic review

ABSTRACT

Background: Early adolescence (ages 10-14) is a period of increased expectations for boys and girls to adhere to socially constructed and often stereotypical norms that perpetuate gender inequalities. The endorsement of such gender norms is closely linked to poor adolescent sexual and reproductive and other health-related outcomes yet little is known about the factors that influence young adolescents' personal gender attitudes.

Objectives: To explore factors that shape gender attitudes in early adolescence across different cultural settings globally.

Methods: A mixed-methods systematic review was conducted of the peer-reviewed literature in 12 databases from 1984-2014. Four reviewers screened the titles and abstracts of articles and reviewed full text articles in duplicate. Data extraction and quality assessments were conducted using standardized templates by study design. Thematic analysis was used to synthesize quantitative and qualitative data organized by the social-ecological framework (individual, interpersonal and community/societal-level factors influencing gender attitudes).

Results: Eighty-two studies (46 quantitative, 31 qualitative, 5 mixed-methods) spanning 29 countries were included. Ninety percent of studies were from North America or Western Europe. The review findings indicate that young adolescents, across cultural settings, commonly express stereotypical or inequitable gender attitudes, and such attitudes appear to vary by individual sociodemographic characteristics (sex, race/ethnicity and immigration, social class, and age). Findings highlight that interpersonal influences (family and peers) are central influences on young adolescents' construction of gender attitudes, and these gender socialization processes differ for boys

and girls. The role of community factors (e.g. media) is less clear though there is some evidence that schools may reinforce stereotypical gender attitudes among young adolescents.

Conclusions: The findings from this review suggest that young adolescents in different cultural settings commonly endorse norms that perpetuate gender inequalities, and that parents and peers are especially central in shaping such attitudes. Programs to promote equitable gender attitudes thus need to move beyond a focus on individuals to target their interpersonal relationships and wider social environments. Such programs need to start early and be tailored to the unique needs of sub-populations of boys and girls. Longitudinal studies, particularly from low-and middle-income countries, are needed to better understand how gender attitudes unfold in adolescence and to identify the key points for intervention.

INTRODUCTION

Adolescence (10-19 years) is a critical period of rapid physical and psychosocial changes, exposing adolescents to sexual and reproductive health risks and opportunities [1-3]. It is also during adolescence that sex-differential mortality and morbidity patterns begin to emerge [1,4]. Specifically, for girls pregnancy complications associated with early pregnancy, childbearing and unsafe abortion, HIV/AIDS and infectious diseases all account for significant mortality [1]. Girls are also more likely than boys to be married as children [5] and to experience forced sexual initiation [6]. It has been estimated that 29% of adolescent girls aged 15-19 years report lifetime physical and/or sexual violence by an intimate partner [7]. On the other hand, for adolescent boys, the top causes of mortality include unintentional injuries from road injuries and interpersonal violence, HIV/AIDS, suicide and drowning [1]. In many societies, boys also engage in more health harming behaviors than girls such as early and heavy smoking, alcohol and illicit drug use [5] and are more likely than girls to engage in early and unprotected sexual behaviors [8].

While there are many factors that explain sex differentials in mortality and morbidity, a key determinant is gender inequality. Gender inequalities manifest in different ways, such as unequal access to resources, power, education and discriminatory socio-cultural practices [9]. While gender inequalities affect the lives of both boys and girls, generally they disproportionately disadvantage girls. At the root of many gender inequalities are gender norms that prescribe different status, power and opportunities to girls and boys according to culturally appropriate versions of masculinities and femininities [9]. We refer to these as *inequitable, unequal or harmful stereotypical gender norms* and use the terms interchangeably (as defined further below). In every

cultural setting across time and place individuals are socialized overtly and covertly from birth to conform to rules for how to "be" girls and boys [10-12]. These gender norms shape the way adolescents interact, form relationships, and engage in sexual and reproductive practices as well as most all social behaviors.

Global data indicate that gender norms are commonly reflected in adolescents' personal *gender attitudes.* For example, population-based surveys in low- and middle-income countries (LMICs) indicate that over half of boys and girls aged 15-19 years justify wife beating under certain conditions [5]. Studies conducted with young men from LMICs further reflect the complexity of gender attitudes where some might eschew harmful gender discriminatory practices but at the same time endorse unequal gender division of labor in the household or other inequitable gender norms [13,14]. Gender attitudes that endorse norms that perpetuate gender inequality are thought to be harmful to both boys and girls. Among young men, endorsement of stereotypical masculinity norms prescribing male dominance and toughness have been associated with substance use, violence and delinquency [15-17], lower male engagement in caregiving and household chores, unsafe sexual behaviors, multiple sexual partners [18-20], higher fertility aspirations, lower rates of male sexual satisfaction, and perpetration of intimate partner violence [21-25]. Conversely, young women and girls are often under pressure to conform to stereotypical norms of female subordination, thus restricting their voice, opportunities and social and sexual decision-making [22].

While gender socialization starts at birth, *early adolescence* (ages 10-14) is a critical point of intensification in personal gender attitudes as puberty reshapes male and female self-perceptions, as well as social expectations from others (e.g. family members,

peers) [26]. With puberty freedom of movement may become more constrained for girls, especially in LMICs, as they are expected to take on more household chores, marry and/or stay away from boys due to adult concerns about their developing bodies and emerging sexuality, whereas boys often experience greater freedom to move outside of the household and engage in leisure activities while also facing increased exposures to environmental risks as well as expectations to work and help support the family financially [27]. Even where it is not socially sanctioned, romantic and sexual feelings begin to emerge and gender roles play out as young people begin to negotiate intimate relationships [28]. Early adolescence is thus seen as a unique opportunity to address gender attitudes before they become more solidified [4,27,29-31]. However, there has yet to be a synthesis of factors that influence gender attitudes during this stage of life. Such knowledge can enable the design and implementation of programs and policies that address harmful stereotypical norms or promote equitable gender norms and in turn improve adolescent sexual and reproductive and other health outcomes.

In response to this gap, the current systematic review seeks to explore the factors that shape young adolescents' gender attitudes across different cultural and geographical settings. We applied a mixed-methods approach, guided by two key research questions: 1) What factors appear to be associated with gender attitudes in early adolescence? (Quantitative studies) and, 2) How do young adolescents learn about and construct gender attitudes in relation to their social environments? (Qualitative studies).

We used the Blum et al [4] conceptual framework for early adolescence to organize, analyze and present the findings. Building on Bronfenbrenner's social-ecological model [32], this framework recognizes that personal attitudes and behaviors

are influenced by multiple factors across different interacting domains, including *individual* (e.g. sociodemographics), *interpersonal relationship* (e.g. family, peers) and *community/societal* (e.g. school, media) levels.

Defining gender attitudes

In the current review gender is viewed as the social and cultural construction of masculine and feminine identities, roles, norms and relationships, rather than an immutable personality trait grounded in biological sex [9,16,17,33,34]. We thus view children and adolescents as actively involved with defining or challenging the social constructions of masculinity and femininity through interactions with their social and cultural environments. We refer to *gender norms* as the widely accepted social rules about roles, traits, behaviors status and power associated with masculinity and femininity in a given culture [10]. In this review, we focus on personal *gender attitudes,* which we define as the individual perceptions, beliefs or endorsement of gender norms [10] (e.g. "It's alright for a man to beat his wife") [35]. It is important to note that not all gender norms and attitudes are harmful. While what is considered as typical or dominant norms about masculinities and femininities vary both within and across time and settings [15-17], in this paper we are particularly interested in the factors related to attitudes that perpetuate unequal power relation between men and women or that stigmatize those who do not ascribe to culturally defined norms (e.g. boys that act "feminine") [17,36]. As noted above, we refer to such attitudes as harmful *stereotypical*, *inequitable or unequal* gender attitudes throughout the paper and use the terms interchangeably.

METHODS

The present systematic review is structured in accordance with a modified version of the *Enhancing Transparency in Reporting the Synthesis of Qualitative Research* (ENTREQ) guidelines [37]. The methods for screening, study selection and synthesis of data were outlined in a protocol[1].

Search strategy

We searched the peer-reviewed literature in 12 databases: PubMed, Psychinfo, EMBASE/MEDLINE, Scopus, ERIC, Global Health, LILACS, Sociological Abstracts, IMSEAR, AIM, IMEMR and WPRIM. Searches were conducted on August 1st and 2nd 2014, with no date or language restrictions. We built our search strategy in three blocks using controlled vocabulary and free-text terms: 1) young adolescents (example: adolescent, child, middle school) AND 2) gender attitudes (e.g. gender attitudes, gender stereotypes) AND 3) factors that influence gender attitudes (example: socialization, interpersonal relationship, parent influence, peer influence). We applied an inclusive approach to search terms related to gender attitudes so as to capture studies that explored this concept but used other terminologies such as "gender identity", "femininities", "sex role", "gender bias" or "gender ideologies". Appendix 3.1 shows the full search strategy for each database[2].

Study selection

Three independent reviewers (AK, SG, AH) divided all records and screened the title and abstracts. Abstracts that passed the initial screen were promoted to full-text review. Each

[1] The protocol is provided as a supplementary document to the *Plos One* publication of this paper (http://journals.plos.org/plosone/article?id=10.1371/journal.pone.0157805).
[2] Appendix 3.1 provides one example; the full strategy is available in the *Plos One* publication (Ibid).

full-text was assessed by two of the reviewers using the following inclusion and exclusion criteria:

1. Primary data analysis. For purposes of this review, we limited inclusion to studies with a primary analysis of data.
2. Published between 1984 and 2014. Given that postmodern feminist theories on the social construction of gender that are relevant for studying gender norms were elaborated during the last two decades of the 20th century (see for example the work by West and Zimmerman [16] and Butler [33]), the review was restricted to studies published in the last 30 years. During the initial search done without any date restrictions, we also found that articles published earlier were largely outdated in terms of their conceptualization of gender, focusing solely on biological sex differences.
3. Study population aged 10 to 14 years (or broader with age sub-groups disaggregated).
4. Focused on personal gender attitudes as the key outcome or phenomenon of interest (using the definition of gender attitudes outlined earlier)
5. Explored at least one factor that might shape gender attitudes (e.g., family, peer or school-related factors).
6. Published in a peer-reviewed journal. While we initially planned to search the grey literature (given that programmatic evaluations and studies from LMICs in particular may not reach the peer-reviewed stage) our time and financial resources did not permit us to explore this literature.

Three reviewers (GNR, MY, NS) assisted with the review of full-texts in languages other than English. All qualitative and quantitative study designs were eligible for inclusion. Assessment discrepancies were resolved by team discussion until consensus was reached.

Data extraction

Four reviewers (AK, SG, AD, GNR) extracted data using a standardized template across the following domains: research question, study design, sampling and sample characteristics, data collection, analysis, key findings, limitations and conclusions[3]. We also extracted detailed information on outcome and exposure variables from quantitative studies, and the phenomenon under investigation from qualitative studies. All extracted data were verified by two of the reviewers (AK, SG); discrepancies were resolved through discussion within the team.

Quality assessment

Quality was assessed separately for quantitative and qualitative studies. For quantitative studies, we used a modified version of the *Effective Public Health Practice Project* (EPHPP) checklist [38], in which each study was rated as strong, moderate, weak or unclear in relation to eight criteria: 1) study design, 2) selection bias, 3) drop-outs, 4) blinding, 5) intervention integrity (if applicable), 6) data collection, and 7) analysis and confounding. For qualitative studies we assessed quality by using an adapted version of the *Critical Appraisal Skill Programme* (CASP) guide [39], rating studies as strong, moderate, weak or unclear based on nine criteria: 1) aims, 2) methodology, 3) link to theory, 4) study design, 5) fieldwork procedures, 6) data analysis, 7) credibility of findings, 8) reflexivity and 9) ethical considerations. For both quantitative and qualitative

[3] The data extraction template is available as a supplementary file to the *Plos One* publication of this paper ((http://journals.plos.org/plosone/article?id=10.1371/journal.pone.0157805).

studies, four reviewers (AK, SG, AD, GNR) independently assessed the overall quality of each study by summarizing the section ratings for each criteria into a global rating for the study as strong (no weak ratings), moderate (one or two weak ratings), or low (three or more weak or unclear ratings) quality. Two reviewers (AK, SG) validated these global ratings and any discrepancies were resolved through discussions amongst the reviewers.

Synthesis

We used a mixed-methods synthesis [40] where we first synthesized all studies separately according to their design (qualitative *vs.* quantitative), followed by an overarching synthesis across methodologies [40,41].

Quantitative synthesis: For the quantitative studies we conducted a thematic summary where we first clustered the factors associated with gender attitudes into categories (e.g. ethnicity, parental education). For each identified factor, we assessed the number of studies that found significant, mixed and no associations. Next, we looked for common associations across studies and summarized these as themes organized by the levels of the socio-ecological framework described by Blum et al [42]. For example, themes related to variations in gender attitudes across factors such as biological sex, age and pubertal development were organized at the individual level, while the interpersonal relationship level included findings that addressed themes related to the association between gender attitudes and parental, sibling and peer factors. Finally, we assessed the robustness of the quantitative synthesis by evaluating the number and relative quality of the studies for each theme.

Qualitative synthesis: For the qualitative studies we used thematic synthesis [42] to analyze the data reported in the studies. First, using Atlas.ti 7® software (Atlas

Corporation, Berlin), we conducted open-ended coding on each text-unit (e.g. sentence or paragraphs) of the included studies. We focused on coding the "raw" participant data such as quotes, but also coded analyses and conclusions made by study authors as qualitative findings reported often reflects the authors' own interpretations [41]. The first round of coding generated 11 initial broad themes (i.e. concepts identified in more than one study), for example "attitudes about femininity norms" or "parental influences". Through an iterative process, these themes were subsequently broken into more refined codes and themes[4]. In this process, similar codes were grouped together into descriptive themes, which in turn were grouped into analytical themes at a higher level [41,42]. For example, codes labeled "boys stigmatize non-stereotypical masculinities" and "boys use humor to enforce masculine norms" were organized under the descriptive theme of "peer harassment", which in turn was structured by the overarching analytical theme of "peers are central in establishing and upholding gender norms".

We assessed the robustness of the qualitative themes using the Confidence in the Evidence from Reviews of Qualitative Research (CERQual) approach [43,44], a tool for evaluating the level of confidence to place in findings from qualitative syntheses. In CERQual, confidence in the evidence is evaluated in four domains which we applied as follows: 1) *methodological limitations of each primary study* (evaluated using the CASP guideline which rated studies as high, moderate or low quality as explained above); 2) *relevance of each study to the review question* (how closely the research questions of primary studies matched those of the current review); 3) *coherence of the individual study findings* (whether or not findings displayed consistent patterns across studies); and

[4] The codebook is available as a supplementary file to the Plos One publication of this paper (http://journals.plos.org/plosone/article?id=10.1371/journal.pone.0157805).

4) *adequacy of the data contributing to a review finding* (the number of studies contributing to a finding as well as the overall richness of the data provided) [43]. Together these four components formed the basis for our overall judgment of confidence in the evidence of each review finding as: high confidence/strong evidence (grounded in several studies of high quality and relevance, "thick" coherent data across different geographical or income settings); moderate confidence/some evidence (some studies of moderate or high quality and relevance, consistent findings across more than one geographical or income setting) or low confidence/weak evidence (few studies of low or moderate quality and relevance, less coherent findings limited to similar geographical or income setting).

RESULTS

General overview

We screened the title and abstract of 14,312 records generated through the database searches, and reviewed the full-text of 1,434 studies. One hundred and eighty-one studies were initially retained for data extraction and 92 were further excluded during this process, mostly because they were not peer-reviewed or did not focus on personal gender attitudes as the key outcome. Ultimately, 82 studies met all inclusion criteria (Figure 3.1). Forty-six of the included studies were of quantitative nature and of these 30 were cross-sectional, nine were longitudinal cohorts, two used a combination of longitudinal and cross-sectional designs, four were quasi-experimental, and one was a randomized controlled trial. Thirty-one studies were qualitative: 13 applied ethnographic study, three used phenomenology or narrative research respectively, two used grounded theory and one was a case study; nine studies did not specify their design beyond "qualitative". Five

studies utilized mixed-methods, of which three were program evaluations (one quasi-experimental and two pre- posttests with control groups) and two described their designs as cross-sectional.

Following the quality assessment criteria described earlier, the quality of most studies was rated as moderate (22 quantitative, 18 qualitative, 1 mixed-methods) or low (17 quantitative, 6 qualitative, 4 mixed-methods). Fourteen studies (7 qualitative and 7 quantitative) were classified as strong quality.

The 82 included studies represented primary data from 29 countries presented in Table 3.1: North America (n=51, mainly United States [US]), Europe (n=23, mainly Great Britain), Latin America and the Caribbean (n=6), sub-Saharan Africa (n=5), Asia (n=5), Middle East African Region (n=3), and Oceania (n=2). Five studies involved multi-country comparisons [45-49]. Most studies included both male and female participants (n=64) and used school-based samples (n=57). The urbanicity (e.g. urban, sub-urban, rural) and relative socioeconomic status (e.g. low, middle, high) of participants varied both within and between studies. However, many did not specify these characteristics. Studies came from a broad range of academic disciplines, including: sociology, psychology, feminist/gender studies, anthropology, public health and education[5].

Describing gender attitudes in early adolescence

Measures of gender attitudes in quantitative studies

[5] A detailed summary of all included studies (author/year, study setting, objective, design, theory, sampling and sample, data collection and analysis, key findings and quality) is available in the Plos One Publication of this paper (http://journals.plos.org/plosone/article?id=10.1371/journal.pone.0157805).

The measurement of gender attitudes varied substantially in the quantitative studies. Most studies operationalized gender attitudes through scales, indices or single-item statements asking adolescents about gender roles (e.g. attitudes about gender-stereotypic occupations, school and family roles) [52,54,55,59,62,65,66,75,77,85,86,88,89,91,97,109,121,122,126,127], stereotypical masculine and feminine behaviors and traits (e.g. stereotypes related to sports and intelligence) [45,51,63,64,68,72,73,78,87,95,96,110,118,125] or endorsement of gender inequitable norms [47,49,56,96,116,119-121]. Other measurement categories included attitudes about gender-based violence [55,58,67,108,119], evaluation of gender non-conforming behaviors [53,70,74,107,123], and perceptions of the "ideal" man or woman [46,69,81]. Due to the heterogeneity in the quantitative measures, it was not possible to compare the prevalence and range of gender attitudes across studies.

Themes related to expressed gender attitudes in qualitative studies

Gender attitudes expressed by young adolescents in qualitative studies conducted in different cultural settings globally were largely stereotypical or inequitable. In a number of studies boys and girls endorsed toughness and physical strength [48,56,60,61,79,80,90,92,101,103-105,111,113-115,117,128] coupled with performance and competiveness [61,79,84,90,102,105,111,113] as essential characteristics for boys [60,61,80,83,93,99,105,111,113,115,124], and emphasized that boys should not "act like girls" or in anyway display traits typically associated with femininity (e.g. by showing emotions or physical weakness). In the US, Great Britain and Brazil, attitudes about masculinity were closely intertwined with heterosexual prowess and had strong homophobic overtones, and in many studies boys perceived male sexual drive to be

biologically determined and highlighted the need to demonstrate manhood by having sex with (many) girls [48,50,71,79,83,101,103,111,114,115,117] and to exercise control over girls in relationships [56,103,115,117,128]. In studies from Brazil and Mexico, young adolescents underscored that boys and men should be able to protect and provide for their families (e.g. economically) [111,113,114].

Conversely, in many studies boys and girls endorsed femininity in terms of girls' physical characteristics of beauty and attractiveness [50,57,71,84,98,100,103] and behavioral compliance and propriety [50,57,60,84,95,98,100,105,111,115]. Girls were described to be physically weak and vulnerable [48,60,92,100,102,105,111,115,124], to have limited freedom and mobility, and to be subordinate to male authority [48,60,82-84,92,100-102,111,112,115,117,121]. Young adolescents in several studies made explicit connections between female sexuality and promiscuity, using terms such as "sluts" or "whores" to describe girls who physically reveal "too much" or act in a sexual way [60,84,94,98-103,111,113,115,117]. In studies from the US and Great Britain, female sexuality was tied to heterosexual romance in that girls often were expected to get (and keep) a boyfriend [50,83,84,98,100,101,103,128].

While in most studies participants endorsed norms that perpetuate gender inequality, there were exceptions. In several studies boys and girls concurrently expressed both stereotypical as well as more equitable attitudes about gender norms [49,50,57,60,101,111,112,114,121]; for example, in Nepal, girls voiced strong opinions in favor of gender equality but at the same time "accepted the status quo" [121], and in Malawi boys expressed support for gender equality but simultaneously voiced their superiority to girls [49,112]. In a number of studies girls described modifying their

expression of femininity depending on the social context [48,57,60,61,83,98,100-102,104]; one example being how Mexican-American girls in the US adjusted their expressions of femininity to please parents and male partners [60]. Furthermore, studies across different geographical settings described how participants (girls in particular) explicitly challenged stereotypical norms and gender inequality. In over half of all qualitative studies, a number of girls critiqued their own and older women's restricted mobility/freedom, spoke up against men's violence against women, rejected adult attempts to control their sexuality as well as pressures to conform to hyperfemininity norms, or noted the impossibility of living up to ideals of the "perfect girl" [46,48,50,57,60,61,82-84,92,100-102,104,115,117,121,124]. While explicit critiques of stereotypical gender norms by boys were less frequent, a few studies indicated that boys challenged masculine stereotypes about toughness and strength and expressed unease with prevailing gender inequalities between men and women [50,90,93,100,101,114,115,117,121,129].

Factors that shape young adolescents' gender attitudes

In the next section we summarize the key individual, interpersonal and community/ societal factors that emerged as potential influences on young adolescents' gender attitudes based on the quantitative and qualitative syntheses. By comparing the quantitative and qualitative themes, we were able to explore how these findings confirmed, explained or contradicted each other.

We found that the quantitative studies largely explored variations in gender attitudes across individual sociodemographic characteristics (e.g. biological sex, race or ethnicity) and a limited number of interpersonal relationship and community-level

factors. Table 3.2 presents an overview of the factors explored by quantitative studies, and Table 3.3 presents a detailed summary of the quantitative findings, including the number and quality of the studies underlying each theme.

We further used the qualitative themes to explain the variability reported in the quantitative studies, and to understand how young adolescents learn about and construct gender attitudes in relation to their social environments. Table 3.4 presents a summary of the analytical and descriptive themes or findings that emerged from the qualitative synthesis, and Table 3.5 provides a detailed summary of each descriptive theme (italicized in the text below) including illustrative quotes. Table 3.5 also includes an explanation of the confidence in each qualitative review theme or finding based on the CERQual assessment as: high (strong evidence), moderate (some evidence), and low (weak evidence).

Individual-level factors

Sex: Over half of quantitative studies (N=37) compared gender attitudes by biological sex and 20 found that adolescent boys are more likely than girls to endorse norms that perpetuate gender inequalities, or conversely that girls report more equitable gender attitudes [47,52,53,55,59,65,68,70,75,81,85-89,91,107,109,118,123] (Table 3.3) This was consistent with the strong qualitative review finding that *girls, more commonly than boys, challenge gender inequalities* [46,48,50,57,60,61,82-84,92,100-102,104,115,117,121,124] (Table 3.5). Qualitative themes of strong confidence further showed that these differences might be partly explained by how *boys face more social barriers to challenge gender inequalities than girls.* In studies from the US, UK, Nepal and Finland boys described that "it is harder to be a guy" because of the social

stigmatization and ridicule of boys that do not conform to the stereotypical masculine norms [60,84,94,99,121]. At the same time, boys from studies conducted in Ghana, Nigeria, Australia, Canada, Great Britain and the US consistently reported having greater relative freedom and power compared to girls, and at times less motivation to challenge gender stereotypes and inequalities [50,60,93,99,111,115,116,124].

Ethnicity, race and immigration history: Three quantitative studies conducted in the US found differences in gender attitudes by race, ethnicity and immigration history [58,69,73]. Due to the heterogeneity of study populations and measures there was however no clear overall trend in these associations. Similarly, three in four studies exploring cross-country variations found that gender attitudes vary between countries (e.g. one study found that attitudes towards male role norms were more stereotypical in the US compared to Scotland) [47], but without a clear trend in associations [45,47,110]. Two studies conducted outside of the US found that language spoken at home and parents' immigration history was associated with varying gender attitudes [107,122]. For example, adolescents of immigrant background in the Netherlands reported more negative attitudes towards gender non-conforming behaviors and perceived higher parental pressures to conform to stereotypical gender roles compared to their native-born peers [107].

Qualitative review findings of strong confidence showed that such variations in part may reflect how *young adolescents of immigrant background experience clashing cultural messages about gender norms*, stemming from differences between their families and host communities [46,60,79,84,93,99,100]. As one example, studies from England [99] and US [60] described how immigrant Asian and Mexican American girls,

respectively, experienced greater parental restriction compared to native peers. Such restrictions were often related to family attitudes about sexuality and concerns that girls' changing bodies would attract male attention. While of low confidence, another qualitative review theme highlighted how *gender norms intersect with racial/ethnical norms and identities*: for example, studies from Great Britain and US described how boys constructed "black" versus "white" masculinities, while Latina and African-American girls in the US expressed different femininity ideals [82,93,99,103].

Social class: In several quantitative studies (N=8) adolescents from higher income backgrounds and/or with more highly educated parents generally expressed more equitable gender attitudes [51,63,81,86,89,91,97,109]. For example, five studies conducted in North America and Western Europe found that higher maternal education and maternal employment were associated with less stereotypical gender attitudes [51,63,81,91,109]. As a potential explanation for these findings, qualitative themes of moderate confidence indicated that *social class might influence the opportunities available to young adolescents,* which in turn may shape their gender attitudes [61,98,100,102,103,106,114]. For example, in studies from the US, Great Britain and Ireland, girls conformed with feminine norms specific to their social class. This included acting like "ladies" [98] or wearing branded clothing [61] to signal higher social class, or alternatively dressing in ways that represented their toughness as working-class girls. A study from Ireland described how working-class girls, in contrast to middle-class peers had to babysit siblings rather than focus on school work [106]. In a study from Mexico, boys living on the streets described difficulties in meeting "machismo" norms (e.g.

holding a job and providing for their families) because of their low socioeconomic status [114].

Age and pubertal development: Several (n=7) longitudinal quantitative studies confirmed that gender attitudes change over time during the early adolescent period [59,65,81,130]. In three studies (two of which use the same dataset), gender attitudes were found to become less stereotypical with increasing age. However, these trajectories varied by sex and family context [59,65,130]. Only two quantitative studies published in 1990 examined the specific association between transition into puberty with gender attitudes, and the findings were inconclusive [65,81]. Qualitative studies from Europe, North America and sub-Saharan Africa suggested that the onset of puberty intensifies social expectations related to gender. While of low confidence, themes drawing on these study findings highlighted *that boys are expected to prove their masculine toughness and sexual prowess* [79,114,117] whereas girls are expected to *hide their developing body and are increasingly restricted, as parents and others in girls' social environments* monitor and limit their mobility and freedom as ways to protect their bodies [79,82,100,117].

Interpersonal relationship level

Family members: The findings from quantitative studies were mixed in terms of the role of parental influence. Two studies found that parental gender division of roles in the home (e.g., mother's time doing house work in relation to father's time) were not associated with their children's gender attitudes [52,109]. In 9 out of 12 studies that examined parents' own gender attitudes, parental attitudes were associated with children's attitudes although the nature of associations varied by biological sex of both

children and parents [52,54,59,62,72,74,75,77,81,86,97,107,109,128]. For example in a study from Sweden, parents' endorsement of gender equality was associated with more equitable attitudes among girls, but not among boys [109]. In a US study, girls whose mothers (but not fathers) endorsed more equitable gender roles developed less stereotypical attitudes over time [52]. Most studies exploring the influence of parents focused on two-parent households, and there were not enough studies focusing on single mothers or fathers to assess whether family structure might influence gender attitudes.

Five quantitative studies (four which used the same dataset) conducted in the US and Western Europe explored the influence of sibling characteristics, including sibling attitudes, sex, and birth order [59,75-77,109]. While all of these studies found significant associations between sibling characteristics and gender attitudes, there was no clear pattern across studies and associations varied by sex.

Qualitative review findings of moderate confidence indicated that *young adolescents learn about gender role expectations in the home* through indirect and direct communication with parents and other family members, highlighting differential gender socialization processes for boys and girls. Girls from studies conducted in low, middle and high-income countries described parental expectations to assist with housework and looking after younger siblings, and contrasted their experiences to how boys were generally "let off the hook" [60,106,111,114,115]. For example, in one study from Ghana, girls had learned to value "feminine" tasks (e.g. caretaking and cooking) less than "masculine" tasks (e.g. physical and technical tasks), and noted the parental sanctions that would follow if they did not adhere to norms related to the gendered division of labor [115].

Findings from qualitative studies across the world provided strong evidence of *tough parental control and restrictions for girls* including strict supervision and regulation of their activities, appearance, education and mobility [60,82,84,92,98,100,102,106,115,117,121]. So too, there was some qualitative evidence that *mothers appear to be especially important in teaching and enforcing stereotypical gender roles* [60,82,84,100,111,115], especially for daughters. In studies from Ghana, Brazil and the US, girls described how their mothers would warn them to "stay away from men" and not engage in "immoral" behavior [60,82,98,115]. In some sites, such admonitions were linked to the father's physical or emotional absence [60,82,115]. Similar to the quantitative studies, however, there were not enough studies focusing on family structure to compare the influence of single *vs.* two parent households or generate a more nuanced understanding of the influence of parental engagement and involvement. There were also examples of how girls learned about unequal gender power relations by observing their parents. In one US-based study, Latina girls described being aware of men's control and power over women based on the experiences of witnessing gender-based violence in their homes [60].

Peers: Qualitative review findings provided strong evidence of the central roles of peers in shaping young adolescents' gender attitudes. A theme that emerged for boys was that *male peer groups enforce competition, toughness and heterosexual prowess*. Specifically, male peers encouraged conformity with masculine norms by issuing physical and verbal challenges to each other [61,79,80,84,103,104,117,128], or encouraging risk-taking practices such as drug-use [113,114] and unsafe sexual practices [111]. In studies from Mexico and Brazil, gang cultures conferred higher status to long-term, older and

physically stronger members of the gang, who conformed to violent and dominating masculine norms [111,113,114]. Studies from different geographical settings highlighted how male peers challenged each other to demonstrate their manhood by showing interest in heterosexual activities or through actual wooing or sexual conquest of (many) girls [61,79,80,84,103,104,111,113,114,117,128]. Qualitative themes of high confidence further showed that *boys who fail to achieve local masculinity standards are bullied or ridiculed by their peers*. Studies in this review described how boys who showed signs of physical and emotional weakness, acted in other stereotypically "feminine" ways, or failed to display heterosexual prowess were frequent targets of ridicule, including homophobic insults from their peers [48,61,71,79,80,83,84,93,101,105,111,113,114,117,124].

For girls, there was strong qualitative evidence that *female peers enforce norms of beauty, appearance and heterosexual romance*. Studies from the US and Great Britain showed that girls' bodies and appearance were subjected to repeated remarks and evaluation against certain standards of beauty [57,61,82,84,98,99,104]. In these two settings as well as in studies from Brazil, girls evaluated each other's femininity in terms of their ability to attract boys [84,98,101,111]. In all of these studies girls described the pressure to conform to norms that required them to present themselves as heterosexually attractive and to strike a balance between being "sexy" but not "too sexy" in order to maintain respectability. Based on studies from Finland, Mexico and Great Britain, there is also some evidence that *peers police gender boundaries related to female sexuality,* for example by calling girls who do not conform to norms of female respectability "sluts" or otherwise shaming or sexually harassing them [94,98,99,101-103,113,114].

Another theme highlighted how *girls experience control and exclusion by male peers*: across different settings, boys prevented girls from voicing their opinions or excluded them from "masculine" activities (e.g. soccer) in order to maintain the inequitable gender norms that gave higher status to boys over girls [49,61,92,94,99,105,112,128].

Community/Societal level

School: While three quantitative studies explored the relationship between school achievement and gender attitudes, their low quality precluded any conclusions across studies [89,91,122]. An additional three quasi-experimental quantitative and mixed-methods studies from the US and Nigeria explored the role of school-based sex education curriculums in shaping gender attitudes [66,116,127]. All found an association between exposure to sex education and more equitable gender attitudes.

Qualitative studies, exclusively from high-income countries in North America, Europe and Oceania, provided some evidence for how *schools regulate and uphold gender norms* through various rules and traditions [57,61,83,84,98,100,105,106,124]. For example, studies from England and Ireland [98,100,106] showed that in upper class schools, rules commonly related to girls' clothing and expectations of "ladylike behavior" reinforced stereotypical feminine norms. Such norms were enforced by school authorities who, for example, regularly checked school uniforms so that skirts could be adjusted to "appropriate lengths" [98] even though the uniforms "restricted the movement" of girls [100]. There was also some qualitative evidence that *schools appear to disproportionately favor boys' activities and performance over girls'* [61,100,105,124]. Studies from US and England described how physical education was dominated by sports

such as football, which promoted toughness, aggression and competitiveness [61,84,90,92,93,100,105]. Such gender norms were communicated by teachers and classmates both through the active exclusion of girls from such sports, and through the stigmatization of boys who did not conform to masculinity stereotypes. The qualitative themes further provided strong evidence that *teachers reinforce stereotypical gender norms* [60,79,80,83,90,94,98,104,105], for example by directing attention to athletic and competitive boys [100,105] and by condoning boys' teasing of girls as evidence of heterosexual attraction [94].

***Media**:* Three quantitative studies examined the influence of media on gender attitudes, and of these two studies from the US found that viewing sexually explicit media or pornography was linked to more stereotypical gender attitudes for girls but not for boys [56,58]. However, in the qualitative studies no particular form of media emerged over others as more influential. Rather, findings provided weak evidence for how a range of *different media appear to influence young adolescent's gender attitudes* (including the role of music and artists such as rappers [79], TV series [48], media campaigns [124] and depictions of romantic relationships in comic books [50]) and that *gender attitudes are constructed through social media and "sexting"* (exchange of sexually explicit pictures or other media) [103,128].

DISCUSSION

This systematic review brings together 30 years of research across 29 countries on the socio-ecological factors that influence gender attitudes during transitions into adolescence. Our findings provide a diverse evidence base for how individual and interpersonal relationship factors, in particular, shape the gender attitudes of boys and

girls. However, the review also highlights the paucity of data on this topic from LMICs, even though 90% of the world's adolescents live in these countries [2]. Rather, nearly all of the peer-reviewed studies included in the current review were conducted in North America or Western Europe, leaving a large information gap from the global South.

Nevertheless, when we look across the review findings globally, there is some uniformity in study findings. First, the qualitative studies suggest that even in the early adolescence phase, boys and girls in different cultural settings commonly endorse norms that perpetuate gender inequalities. For example, studies highlighted how young adolescents' attitudes supported masculinity predicated on toughness/competitiveness and heterosexual prowess, in contradistinction to femininity predicated on weakness, physical appearance and the control and shaming of female sexuality. Encouragingly, some studies also report ambivalence and challenging of stereotypical gender norms by many young adolescents, suggesting that gender attitudes among this age group are amenable to change.

Secondly, boys and girls appear to differ in their endorsement of stereotypical gender norms and qualitative review findings suggest that this sex-based difference may be due to the differential gender socialization processes and pressures. Gender attitudes of girls seem to be shaped by how parents, siblings, peers and teachers overtly and covertly police their appearances and sexualities, and restrict their mobility and freedom. Whether or not they try to challenge stereotypical gender norms, girls appear to experience comparatively limited freedom and recognize their own disadvantage *because they are girls.* Nevertheless, girls appear less likely than boys to accept stereotypical or inequitable gender norms. This is in line with increased recognition that adolescent girls

are not passive victims of gender discriminatory practices; and that enhancing and supporting their individual agency and autonomy can help promote equitable gender norms and attitudes [36].

In contrast, we found few examples of boys challenging norms that perpetuate gender inequalities. The review findings indicate that gender attitudes of boys are strongly shaped by peer sanctions reinforcing stereotypically masculine attributes and behaviors (discussed in more detail below). As noted by Lahelma [94], whose observations of Finish middle-school students was included in the present review, "boys experience restrictions not from being boys, but because they are the *wrong sort of boys"*. Challenging stereotypical norms or engaging in stereotypically feminine activities (e.g. household chores) may be associated with perceived loss of male status and power [36,131]. Additionally, boys' reluctance to challenge norms may be explained by the lack of role models who demonstrate non-stereotypical and alternative masculinity norms and practices [36]. For example, Barker's [132] research with older adolescent boys and young men in Brazil, India and Nigeria, found that boys whose viewpoints were "supported or reinforced by someone else in their social context" were more likely to endorse equitable norms. As explained by Bicchieri [133], personal attitudes are strongly correlated with perceived peer social norms; i.e., my perceptions of what my peers endorse and do, and what my peers expects of me, will in turn influence my own attitudes and behavior.

Thirdly, gender attitudes appear to vary by ethnicity, race, immigration history and social class. For example, several studies highlighted that masculinity norms of minority groups may differ from those of the dominant culture. This reflects the

intersectionality of social, cultural, and economic factors as they influence and shape multiple types of social norms and inequalities including gender norms [134,135].

Finally, this review reinforces the centrality of parents and caregivers in shaping gender attitudes of young adolescents. This is consistent with studies focused on early childhood, which suggest that gender socialization begins at birth and operates throughout childhood at multiple levels through play and interactions with parents and other family members [136]. However, while there were several themes around the central role of parents, few studies focused on the role of family structure or how parental involvement as well as work in- or outside of the household might influence gender attitudes. More in-depth research around how family context shapes gender socialization processes in early adolescence is thus needed. For example, more evidence is needed around the effectiveness of interventions that focus on enhancing parental skills and improve parent-child relationships, which can be promising approaches for improving early adolescent health and development [137].

Socialization processes during early adolescence differ from early childhood, as the entrance into puberty brings new expectations and roles. In the current review, peers emerged as one of the strongest influences on personal gender attitudes among 10-14 -year-olds. This is consistent with research suggesting that the influence of peers is greater during early adolescence than either before or after [138,139].

While there is some research highlighting that schools and teachers in particular are important institutions for gender socialization during childhood and adolescence [140], the specific influence of these factors on young adolescents' gender attitudes remains poorly studied outside of high-income settings. Studies show that when girls

remain in schools, gender equality is enhanced by delaying marriage and reducing early childbearing [30]. However, drawing on limited qualitative studies from high-income countries, our review suggests that schools can also reinforce stereotypical gender norms by promoting male dominated sports in physical education that reinforce toughness and competition, and excluding girls and boys who do not conform to such values. This finding is consistent with other literature highlighting that prevailing school cultures may reinforce traditional and conservative values about gender norms [141].

Another societal level institution that is hypothesized to play a role in shaping gender attitudes is both receptive (e.g., TV, radio) and social media. Given the small number of studies that have explored this issue and the rapid changes in media consumption habits of young people, additional research is needed to better understand the influence of media on gender attitudes of young adolescents.

Strengths and limitations

While many of the findings of this review may not come as a surprise to those familiar with adolescent health and gender socialization research, to our knowledge this is the first attempt to systematically bring together the evidence on what shapes young adolescents' gender attitudes globally. This review highlights what is currently known about gender attitudes in early adolescence as well as where research in this field is currently lacking. The strength of the review is the use of a rigorous systematic approach and its grounding in peer reviewed primary studies across different geographical and cultural settings, the use of the widely applied social-ecological framework to analyze and synthesize the findings, and the assessment of the robustness of the review findings/themes. The review also highlights the importance of reviewing both qualitative and quantitative research to

understand the complexity that lies behind the formation and expression of gender attitudes.

The results from the current review should also be considered in light of its limitations. While we strived for a comprehensive search of the literature, it is possible that we missed relevant studies. For example, we were unable to review grey literature published on websites and in reports that may have captured more studies from LMICs. Because of this restriction, all results should be interpreted with caution when applied to settings other than North America and Western Europe. However, we attempted to capture as many relevant studies as possible by searching a wide range of databases and by piloting our search strategy, while also maintaining the quality of research that is supported by the peer review process. Furthermore, with few exceptions most studies reported in this review were based on cross-sectional study design, limiting the ability to draw temporal conclusions on factors that influence gender attitudes over time. Even though the number of longitudinal studies on whether and how gender attitudes change during this period of life was limited, there is some indication that early adolescence may be a turning point for the development of gender attitudes. For example, research by Crouter et al. [59] indicates that on average, prior to age 14 adolescents expressed more equitable gender attitudes as they aged, while after age 14 gender attitudes became increasingly more stereotypic.

Furthermore, the vastly different outcome measures used in quantitative studies limits their generalizability. It is also difficult to draw conclusions about how individual, interpersonal and community level factors influence the construction of gender attitudes

at a global level, as their influence is context specific (both between countries and within countries) including to subpopulations.

Implications for programs

While it is beyond the scope of the current review to determine what interventions and approaches can change inequitable gender attitudes, the review findings point to a few areas that should be considered in developing programs during transitions into adolescence. The findings highlight that programs to promote gender equality and tackle harmful stereotypical attitudes need to be tailored to the specific needs and influences of boys and girls. Approaches to empower girls to overcome the restrictions and disadvantages they face may include improved access to education (completion of primary and secondary school) and informing girls about their rights, as well as other activities (e.g. mentoring, sports) that have been found to promote girls' agency, autonomy, self-esteem and ability to challenge inequitable gender norms [36,142]. On the other hand, boys need approaches that both enable them to recognize their unearned privileges and power while supporting them to challenge stereotypical norms about masculinities and femininities, and rewarding rather than stigmatizing them when they are able to do so. Our findings also highlight the importance of recognizing the diversity of the early adolescent population by tailoring approaches to specific sub-cultures of boys and girls based on factors such as race and ethnicity, immigration history and social class.

The importance of puberty as a key moment for shaping gender attitudes, and the close links of such attitudes to sexuality suggest that comprehensive sexuality education and other developmentally appropriate life-skills education curricula are key entry points. There is increasing evidence that young adolescents benefit from comprehensive

sexuality education that helps empower them to make informed decisions and be equal partners in relationships [137,143,144]. Given the evidence that addressing gender and power relations as part of comprehensive sexuality education programs is related to better sexual and reproductive health outcomes [145], it is essential that such programs include explicit content on gender norms, beginning in childhood and continuing throughout adolescence.

Importantly, the strong influence of interpersonal relationships on young adolescents' gender attitudes supports previous research highlighting the need for interventions to target not only individual adolescents, but also their social networks including families and peers [137,146]. In the current review, we identified three programs with peer-reviewed evaluations that were designed to generate critical reflection and dialogue about gender norms among peers, with adult role models and within communities.

In Nepal, the *CHOICES* curriculum developed by Save the Children focused on critical reflection on inequitable gender norms (so called "gender transformative" approach) among 10-14 -year-old boys and girls in the Siraha district. The curriculum, targeting emotions and behaviors related to gender equality, was implemented during weekly sessions held in child clubs over a three-month period. A pilot evaluation showed that *CHOICES* appeared to have changed attitudes about gender norms among young adolescents when comparing pre- and post intervention tests to those of control groups [121]. To complement the individual focus of the *CHOICES* curriculum, Save the Children subsequently developed two other interventions (not included in the current review) called *PROMISES* (targeting community gender norms) and *VOICES* (targeting

parents). The latter uses testimonials of mothers and fathers to encourage other parents in the community to be more supportive of gender equality and gender norms transformation. An evaluation of the concurrent effect of these three curriculums is currently ongoing in Nepal [147].

In Honduras, Yemen, Malawi, India, Tanzania and Egypt, the *Power to Lead Alliance* (PTLA) implemented by CARE International between 2008 and 2011 worked with both young adolescent boys and girls to promote gender equality by promoting girls' education and leadership skills through three components: 1) extracurricular activities (e.g. music, arts, sports, life skills groups, academic clubs and awareness campaigns), 2) social networks allowing girls and boys to socialize with peers and discuss issues such as early marriage and sexual relationships in "safe spaces"; and 3) civic action initiatives involving the surrounding community. A pre-post evaluation found that girls and boys from *PLTA* intervention sites had more equitable gender attitudes than girls and boys from comparison sites [49,112].

The third program included in the current review, *Parivartan*, used an adapted version of the US-based "Coaching boys into men" program to prevent gender-based violence by working with young adolescent cricket athletes in schools in Mumbai, India and specifically engaging their coaches as positive role models to challenge stereotypical gender norms and stand up against gender-based violence through bystander interventions. A 12-month non-randomized pre-post evaluation found that gender attitudes were more equitable among athletes whose coaches participated in the intervention as compared to those whose coaches received standard coaching [120].

Although these studies found some effect on a measure of gender attitudes, the

interventions were substantially different from each other in their nature and the overall quality of study design so that it was not possible to draw conclusions on what factors contributed to changing gender attitudes among the participants exposed to the interventions. Overall, young adolescents have received little programmatic attention in contrast to both younger children and older peers, and of those few programs exist that have been rigorously evaluated. More research is needed to identify promising and effective interventions that challenge norms that perpetuate gender inequalities among young adolescents [137]. Given the findings of this review, such research needs to develop and evaluate interventions that address the role of and interactions with parents and other family members as well as peers in addressing harmful gender stereotypes.

This review confirms other literature highlighting that early adolescence is a critical window of opportunity for countering stereotypical gender attitudes. The promotion of equitable gender attitudes is a crucial element of achieving gender equality in ways that can have many benefits for the health of adolescents as well as their health into adulthood. As the global health and development community seeks to implement the sustainable development goals (SDGs) and the 2030 development agenda, this review highlights not only the importance of focusing on early adolescence in all relevant SDGs related to health, education and gender equality, but also of the need to promote gender equitable norms in all aspects of programming and policies aimed at adolescents. Early investments in promoting gender equality in this age-group has the potential for yielding important social, economic and health benefits in the long-term as fewer harm-reduction investments will be required later in adolescence and adulthood [27].

Conclusions

This systematic review provides a robust evidence-base of the key individual and interpersonal relationship factors that shape gender attitudes during early adolescence. Most studies were conducted in North America and Western Europe, leaving a large gap in the global peer-reviewed literature. Nevertheless, the stereotypical gender attitudes expressed by young adolescents both in LMICs and high-income countries indicate that there is still a long way to go in addressing norms that perpetuate unequal gender and power relations. Our findings highlight that programs to promote equitable gender attitudes need to target not just individuals, but their interpersonal relationships. Such programs further need to be tailored according to the unique needs of sub-populations of boys and girls. The review also shows several critical gaps in research that need to be addressed. First, the measurement of personal gender attitudes across settings is variable. Hence, there is a need to better define and standardize ways of measuring and tracking individual gender attitudes as well as social norms while maintaining their relevance across cultures. Second, we need longitudinal studies to better understand the evolving nature of gender attitudes in early adolescence and their impact on health trajectories over time, particularly as young adolescents experience onset of puberty and sexual maturation. And third, we need a better understanding of the role of communities and societal institutions such as media, schools, religious and sports among others.

CHAPTER 3 REFERENCES

1. WHO. Health for the World's Adolescents. A second change in the second decade. Geneva: WHO; 2014.

2. UNFPA. The power of 1.8 billion. Adolescents, youth and the transformation of the Future. State of World Population 2014. New York: UNFPA; 2014.

3. Blum RW, Bastos FIPM, Kabiru CW, Le LC. Adolescent health in the 21st century. The Lancet. 2012;379: 1567-1568.

4. Blum RW, Astone NM, Decker MR, Mouli VC. A conceptual framework for early adolescence: A platform for research. Int J Adolesc Med Health. 2014;26: 321-331.

5. UNICEF. Progress for children. A report card for adolescents. New York: UNICEF; 2012.

6. Moore AM, Awusabo-Asare K, Madise N, John-Langba J, Kumi-Kyereme A. Coerced first sex among adolescent girls in sub-Saharan Africa: Prevalence and context. Afr J Reprod Health. 2007;11: 62-82.

7. WHO. Global and regional estimates of violence against women. Prevalence and health effects of intimate partner violence and nonpartner sexual violence. Geneva; 2013.

8. Dixon-Mueller R. How young is "too young"? Comparative perspectives on adolescent sexual, marital, and reproductive transitions. Studies in family planning. 2008;39: pp. 247-262.

9. WHO. Gender fact sheet. Available: http://www.who.int/mediacentre/factsheets/fs403/en/ll

10. Ryle R. Questioning Gender: A sociological exploration. CA, USA: Sage Publications, Inc;2011.

11. Leaper C, Friedman C. The socialization of gender. In: Grusec J, Hastings P, editors. Handbook of socialization: Theory and research. New York, NY: Guilford Press; 2006: pp. 561-587.

12. Galambos NL. Gender and gender role development in adolescence; Lerner R, Steinberg L, editors. Hoboken, NJ, US: John Wiley & Sons Inc;2004.

13. Scott J, Hacker M, Averbach S, Modest AM, Cornish S, Spencer D, et al. Influences of sex, age and education on attitudes towards gender inequitable norms and practices in South Sudan. Glob Public Health. 2014;9: 773-786.

14. Peacock D, Barker G. Working with men and boys to prevent gender-based violence: Principles, lessons learned, and ways forward. Men and Masculinities. 2014;17: 578-599.

15. Courtenay WH. Constructions of masculinity and their influence on men's well-being: A theory of gender and health. Soc Sci Med. 2000;50: 1385-1401.

16. West C, Don HZ. Doing Gender. Gender and Society. 1987;1: 125-151.

17. Connell R. Gender and power: Society, the person and sexual politics: John Wiley & Sons;1987.

18. Pulerwitz J, Barker G, Segundo M, Nascimento M. Promoting more gender-equitable norms and behaviors among young men as an HIV/AIDS prevention strategy. *Horizons final report*. Washington, DC: Population Council; 2006.

19. Pleck JH, Sonenstein FL, Ku LC. Masculinity ideology: Its impact on adolescent males' heterosexual relationships. Journal of Social Issues. 1993;49: 11-29.

20. Barker G. Gender equitable boys in a gender inequitable world: Reflections from qualitative research and programme development in Rio de Janeiro. Sexual and Relationship Therapy. 2000;15: 263-282.

21. Shearer CL, Hosterman SJ, Gillen MM, Lefkowitz ES. Are traditional gender role attitudes associated with risky sexual behavior and condom-related beliefs? Sex Roles. 2005;52: 311-324.

22. Jewkes R, Morrell R. Gender and sexuality: Emerging perspectives from the heterosexual epidemic in South Africa and implications for HIV risk and prevention. Journal of the International AIDS Society. 2010;13: 6.

23. Santana MC, Raj A, Decker MR, La Marche A, Silverman JG. Masculine gender roles associated with increased sexual risk and intimate partner violence perpetration among young adult men. Journal of urban health. 2006;83: 575-585.

24. Reed E, Silverman JG, Raj A, Decker MR, Miller E. Male perpetration of teen dating violence: Associations with neighborhood violence involvement, gender attitudes, and perceived peer and neighborhood norms. Journal of Urban Health. 2011;88: 226-239.

25. Snow RC, Winter RA, Harlow SD. Gender attitudes and fertility aspirations among young men in five high fertility East African countries. Stud Fam Plann. 2013;44: 1-24.

26. Hill J, Lynch M. The intensification of gender-related role expectations during early adolescence. In: Brooks-Gunn J, Petersen A, editors. Girls at Puberty: Springer US; 1983: pp. 201-228.

27. Igras SM, Macieira M, Murphy E, Lundgren R. Investing in very young adolescents' sexual and reproductive health. Global public health. 2014;9: 555-569.

28. Auslander BA, Rosenthal SL, Blythe MJ. Understanding sexual behaviors of adolescents within a biopsychosocial framework. Adolesc Med State Art Rev. 2007;18: 434-448, v.

29. Dixon-Mueller R. The sexual and reproductive health of younger adolescents: Research issues in developing countries. Geneva: WHO; 2011.

30. UNFPA. Motherhood in Childhood. Facing the challenge of adolescent pregnancy. State of World Population 2013. New York: UNFPA; 2013.

31. UNFPA, Population Council. Investing when it counts. Generating the evidence base for policies and programmes for very young adolescents. Guide and tool kit. New York: Population Council, UNFPA; 2006.

32. Bronfenbrenner U. Ecological systems theory. Annals of Child Development. 1989;6: 187-249.

33. Butler J. Gender trouble, feminist theory, and psychoanalytic discourse. Feminism/postmodernism. 1990: 324-340.

34. Ridgeway CL, Correll SJ. Unpacking the gender system: A theoretical perspective on gender beliefs and social relations. Gender & Society. 2004;18: 510-531.

35. Pulerwitz J, Barker G. Measuring attitudes toward gender norms among young men in Brazil: Development and psychometric evaluation of the GEM scale. Men and Masculinities. 2007.

36. Marcus R, Harper C. Gender justice and social norms - processes of change for adolescent girls. Towards a conceptual framework 2. ODI, Overseas Development Institute; 2014.

37. Tong A, Flemming K, McInnes E, Oliver S, Craig J. Enhancing transparency in reporting the synthesis of qualitative research: ENTREQ. BMC Med Res Methodol. 2012;12: 181.

38. Effective Public Health Practice Project. Quality Assessment tool for quantitative studies. Available: http://www.ephpp.ca/tools.htmll

39. Critical Appraisal Skills Programme (CASP). Available: http://www.casp-uk.netll

40. Sandelowski M, Voils C, Barroso J. Defining and Designing Mixed Research Synthesis Studies. Research in the schools : a nationally refereed journal sponsored by the Mid-South Educational Research Association and the University of Alabama. 2006;13.

41. Gough D, Oliver S, Thomas J. An introduction to systematic reviews: Sage;2012.

42. Thomas J, Harden A. Methods for the thematic synthesis of qualitative research in systematic reviews. BMC medical research methodology. 2008;8: 45.

43. Lewin S, Glenton C, Munthe-Kaas H, Carlsen B, Colvin CJ, Gulmezoglu M, et al. Using qualitative evidence in decision making for health and social interventions: An approach to assess confidence in findings from qualitative evidence syntheses (GRADE-CERQual). PLoS Med. 2015;12: e1001895.

44. Bohren MA, Vogel JP, Hunter EC, Lutsiv O, Makh SK, Souza JP, et al. The mistreatment of women during childbirth in health facilities globally: A mixed-methods systematic review. PLoS Med. 2015;12: e1001847.

45. Trice AD. Italian, Bulgarian, and U.S. children's perceptions of gender-appropriateness of occupations. J Soc Psychol. 2000;140: 661-663.

46. Stiles DA. Opposite-sex ideal in the U.S.A. and Mexico as perceived by young adolescents. Journal of Cross-Cultural Psychology. 1990;21: 180-199.

47. Levant RF, Graef ST, Smalley KB, Williams C, McMillan N. Evaluation of the psychometric properties of the Male Role Norms Inventory-Adolescent (MRNI-A). Thymos: Journal of Boyhood Studies. 2008;2: 46-59.

48. Bowen E, Holdsworth E, Leen E, Sorbring E, Helsing B, Jaans S, et al. Northern European adolescent attitudes toward dating violence. Violence Vict. 2013;28: 619-634.

49. Baric S. Where the boys are: Engaging young adolescent boys in support of girls' education and leadership. Gender and Development. 2013;21: 147-160.

50. Moffatt L, Norton B. Reading gender relations and sexuality: Preteens speak out. Canadian Journal of Education. 2008;31: 102-123.

51. Serbin LA, Powlishta KK, Gulko J. The development of sex typing in middle childhood. Monogr Soc Res Child Dev. 1993;58: 1-99.

52. Baruch GK, Barnett RC. Fathers' participation in family work and children's sex-role attitudes. Child Dev. 1986;57: 1210-1223.

53. Blakemore JEO. Children's beliefs about violating gender norms: Boys shouldn't look like girls, and girls shouldn't act like boys. Sex Roles. 2003;48: 411-419.

54. Bohannon JR, Blanton PW. Gender role attitudes of American mothers and daughters over time. J Soc Psychol. 1999;139: 173-179.

55. Boxley J, Lawrance L, Gruchow H. A preliminary study of eighth grade students' attitudes toward rape myths and women's roles. J Sch Health. 1995;65: 96-100.

56. Brown JD, L'Engle KL. X-rated: Sexual attitudes and behaviors associated with U.S. early adolescents' exposure to sexually explicit media. Communication Research. 2009;36: 129-151.

57. Brown LM. Performing femininities: Listening to white working-class girls in rural Maine. Journal of Social Issues. 1997;53: 683-701.

58. Cowan G, Campbell RR. Rape causal attitudes among adolescents. Journal of Sex Research. 1995;32: 145-153.

59. Crouter AC, Whiteman SD, McHale SM, Osgood DW. Development of gender attitude traditionality across middle childhood and adolescence. Child Dev. 2007;78: 911-926.

60. Denner J, Dunbar N. Negotiating femininity: Power and strategies of Mexican American girls. Sex Roles. 2004;50: 301-314.

61. Eder D, Parker S. The cultural production and reproduction of Gender: The effect of extracurricular activities on peer-group culture. Sociology of Education. 1987;60: 200-213.

62. Emihovich CA, Gaier EL, Cronin NC. Sex-role expectations changes by fathers for their sons. Sex Roles. 1984;11: 861-868.

63. Foshee VA, Bauman KE. Gender stereotyping and adolescent sexual behavior: A test of temporal order. Journal of Applied Social Psychology. 1992;22: 1561-1579.

64. Funk JB, Buchman DD. Children's perceptions of gender differences in social approval for playing electronic games. Sex Roles. 1996;35: 219-232.

65. Galambos NL, Almeida DM, Petersen AC. Masculinity, femininity, and sex role attitudes in early adolescence: exploring gender intensification. Child Dev. 1990;61: 1905-1914.

66. Grose RG, Grabe S, Kohfeldt D. Sexual education, gender ideology, and youth sexual empowerment. J Sex Res. 2014;51: 742-753.

67. Hertzog JL, Rowley RL. My beliefs of my peers' beliefs: exploring the gendered nature of social norms in adolescent romantic relationships. J Interpers Violence. 2014;29: 348-368.

68. Hoover R, Fishbein HD. The development of prejudice and sex role stereotyping in white adolescents and white young adults. Journal of Applied Developmental Psychology. 1999;20: 431-448.

69. Jones LR, Fries E, Danish SJ. Gender and ethnic differences in body image and opposite sex figure preferences of rural adolescents. Body Image. 2007;4: 103-108.

70. Katz PA, Ksansnak KR. Developmental aspects of gender role flexibility and traditionality in middle childhood and adolescence. Developmental Psychology. 1994;30: 272-282.

71. Korobov N. Ironizing Masculinity: How adolescent boys negotiate hetero-hormative dilemmas in conversational interaction. The Journal of Men's Studies. 2005;13: 225-246.

72. Kurtz-Costes B, Rowley SJ, Harris-Britt A, Woods TA. Gender Stereotypes about mathematics and science and self-perceptions of ability in late childhood and early adolescence. Merrill-Palmer Quarterly: Journal of Developmental Psychology. 2008;54: 386-409.

73. Liben LS, Bigler RS. The developmental course of gender differentiation: conceptualizing, measuring, and evaluating constructs and pathways. Monogr Soc Res Child Dev. 2002;67: i-viii, 1-147; discussion 148-183.

74. Lurye LE, Zosuls KM, Ruble DN. Gender identity and adjustment: understanding the impact of individual and normative differences in sex typing. New Dir Child Adolesc Dev. 2008: 31-46.

75. McHale SM, Crouter AC, Tucker CJ. Family context and gender role socialization in middle childhood: comparing girls to boys and sisters to brothers. Child Dev. 1999;70: 990-1004.

76. McHale SM, Kim JY, Whiteman S, Crouter AC. Links between sex-typed time use in middle childhood and gender development in early adolescence. Dev Psychol. 2004;40: 868-881.

77. McHale SM, Updegraff KA, Helms-Erikson H, Crouter AC. Sibling influences on gender development in middle childhood and early adolescence: a longitudinal study. Dev Psychol. 2001;37: 115-125.

78. Meaney KS, Dornier LA, Owens MS. Sex-role stereotyping for selected sport and physical activities across age groups. Percept Mot Skills. 2002;94: 743-749.

79. Mora R. “Do it for all your pubic hairs!”: Latino boys, masculinity, and puberty. Gender & Society. 2012;26: 433-460.

80. Mora R. "Dicks are for Chicks": Latino boys, masculinity, and the abjection of homosexuality. Gender and Education. 2013;25: 340-356.

81. Nelson C, Keith J. Comparisons of female and male early adolescent sex role attitude and behavior development. Adolescence. 1990;25: 183-204.

82. O'Sullivan LF, Meyer-Bahlburg HFL, Watkins BX. Social cognitions associated with pubertal development in a sample of urban, low-Income, African-American and Latina girls and mothers. Journal of Adolescent Health. 2000;27: 227-235.

83. Peterson S. Gender meanings in grade eight students' talk about classroom writing. Gender and Education. 2002;14: 351-366.

84. Qin DB. Being 'good' or being 'popular': Gender and ethnic identity negotiations of Chinese immigrant adolescents. Journal of Adolescent Research. 2009;24: 37-66.

85. Reis SM, Callahan CM. Attitudes of adolescent gifted girls and boys toward education, achievement, and the future. Gifted Education International. 1994;9: 144-151.

86. Richmond-Abbott M. Sex-role attitudes of mothers and children in divorced, single-parent families. Journal of Divorce. 1984;8: 61-81.

87. Riemer BA, Visio ME. Gender typing of sports: An investigation of Metheny's classification. Res Q Exerc Sport. 2003;74: 193-204.

88. Schuette C, Killen M. Children's evaluations of gender-stereotypic household activities in the family context. Early Education and Development. 2009;20: 693-712.

89. Signorielli N, Lears M. Children, television, and conceptions about chores: Attitudes and behaviors. Sex Roles. 1992;27: 157-170.

90. Tischler A, McCaughtry N. PE is not for me: When boys' masculinities are threatened. Res Q Exerc Sport. 2011;82: 37-48.

91. Valenzuela A. Liberal gender role attitudes and academic achievement among Mexican-origin adolescents in two Houston inner-city Catholic schools. Hispanic Journal of Behavioral Sciences. 1993;15: 310-323.

92. Vu MB, Murrie D, Gonzalez V, Jobe JB. Listening to girls and boys talk about girls' physical activity behaviors. Health Education & Behavior. 2006;33: 81-96.

93. Way N, Cressen J, Bodian S, Preston J, Nelson J, Hughes D. “It might be nice to be a girl... Then you wouldn’t have to be emotionless”: Boys' resistance to norms of masculinity during adolescence. Psychology of Men & Masculinity. 2014;15: 241-252.

94. Lahelma E. Female paths to adulthood in a country of 'genderless gender'. Gender and Education. 2012;24: 1-13.

95. Granié M-A, Papafava E. Gender stereotypes associated with vehicle driving among French preadolescents and adolescents. Transportation Research Part F: Traffic Psychology and Behaviour. 2011;14: 341-353.

96. Ndobo A. Discourse and attitudes on occupational aspirations and the issue of gender equality: What are the effects of perceived gender asymmetry and prescribed gender role? European Review of Applied Psychology / Revue Européenne de Psychologie Appliquée. 2013;63: 231-241.

97. Hess M, Ittel A, Sisler A. Gender-specific macro- and micro-level processes in the transmission of gender role orientation in adolescence: The role of fathers. European Journal of Developmental Psychology. 2014;11: 211-226.

98. Allan AJ. The importance of being a 'lady': hyper-femininity and heterosexuality in the private, single-sex primary school. Gender and Education. 2009;21: 145-158.

99. Archer L. 'Muslim brothers, black lads, traditional Asians': British Muslim young men's constructions of race, religion and masculinity. Feminism & Psychology. 2001;11: 79-105.

100. Paechter C, Clark S. Who are tomboys and how do we recognise them? Women's Studies International Forum. 2007;30: 342-354.

101. Renold E. "They won't let us play ... Unless you're going out with one of them": Girls, boys and Butler's "Heterosexual Matrix" in the primary years. British Journal of Sociology of Education. 2006;27: 489-509.

102. Renold E, Ringrose J. Regulation and rupture: Mapping tween and teenage girls' resistance to the heterosexual matrix. Feminist Theory. 2008;9: 313-338.

103. Ringrose J, Harvey L, Gill R, Livingstone S. Teen girls, sexual double standards and 'sexting': Gendered value in digital image exchange. Feminist Theory. 2013;14: 305-323.

104. Skelton C, Francis B, Read B. "Brains before "beauty"?" High achieving girls, school and gender identities. Educational Studies. 2010;36: 185-194.

105. Swain J. 'The money's good, the fame's good, the girls are good': The Role of playground football in the construction of young boys' masculinity in a junior school. British Journal of Sociology of Education. 2000;21: 95-109.

106. O'Brien M. Girls and transition to second-level schooling in Ireland: 'Moving on' and 'moving out'. Gender and Education. 2003;15: 249-267.

107. Bos HMW, Picavet C, Sandfort TGM. Ethnicity, gender socialization, and children's attitudes toward gay men and lesbian women. Journal of Cross-Cultural Psychology. 2012;43: 1082-1094.

108. de Lemus S, Moya M, Glick P. When contact correlates with prejudice: Adolescents' romantic relationship experience predicts greater benevolent sexism in boys and hostile sexism in girls. Sex Roles. 2010;63: 214-225.

109. Evertsson M. The reproduction of gender: Housework and attitudes towards gender equality in the home among Swedish boys and girls. Br J Sociol. 2006;57: 415-436.

110. Payne MA. West Indian teachers', parents', and students' attitudes toward adolescent behavior problems. Adolescence. 1986;21: 235-245.

111. Ribeiro JSB. Girl's and Boy's Games: Socialization, sexuality and gender among children and the social construction of the differences. Cadernos pagu. 2006: 145-168.

112. Miske Witt Associates. The Power to Lead Alliance (PTLA): Empowering girls to learn and lead. Final evaluation report for CARE USA. Saint Paul, Minnesota, USA: CARE USA, USAID; 2011. 1-73 p.

113. Herńandez Ordoñez A. Social representation of male gender in a group of children and youth living in the streets in Mexico City. Part two. Salud Mental. 2006;29: 56-63.

114. Stern C, Fuentes-Zurita C, Lozano-Trevino LR, Reysoo F. Masculinity and sexual and reproductive health: A case study among adolescents of Mexico City. La salud de adolescentes. 2003;45: S34-S43.

115. Ampofo AA. "When men speak women listen": Gender socialisation and young adolescents' attitudes to sexual and reproductive issues. Afr J Reprod Health. 2001;5: 196-212.

116. Esiet AO, Esiet U, Philliber S, Philliber WW. Changes in knowledge and attitudes among junior secondary students exposed to the family life and HIV education curriculum in Lagos State, Nigeria. Afr J Reprod Health. 2009;13: 37-46.

117. Ragnarsson A, Onya HE, Thorson A, Ekstrom AM, Aaro LE. Young males' gendered sexuality in the era of HIV and AIDS in Limpopo Province, South Africa. Qual Health Res. 2008;18: 739-746.

118. Shamai S. Possibilities and limitations of a gender stereotypes intervention program. Adolescence. 1994;29: 665-680.

119. Das M, Ghosh S, Verma R, O'Connor B, Fewer S, Virata MC, et al. Gender attitudes and violence among urban adolescent boys in India. International Journal of Adolescence and Youth. 2014;19: 99-112.

120. Miller E, Das M, Tancredi DJ, McCauley HL, Virata MCD, Nettiksimmons J, et al. Evaluation of a gender-based violence prevention program for student athletes in Mumbai, India. Journal of Interpersonal Violence. 2014;29: 758-778.

121. Lundgren R, Beckman M, Chaurasiya SP, Subhedi B, Kerner B. Whose turn to do the dishes? Transforming gender attitudes and behaviours among very young adolescents in Nepal. Gender and Development. 2013;21: 127-145.

122. Tay LS, Gibbons JL. Attitudes toward Gender Roles among Adolescents in Singapore. Cross-Cultural Research. 1998;32: 257-278.

123. Park Y, Lee‐Kim J, Killen M, Park K, Kim J. Korean children's evaluation of parental restrictions regarding gender-stereotypic peer activities. Social Development. 2012;21: 577-591.

124. McMahon M, Patton W. Gender differences in children and adolescents' perceptions of influences on their career development. School Counselor. 1997;44: 368-376.

125. Smith J, Russell G. Why do males and females differ? Children's beliefs about sex differences. Sex Roles. 1984;11: 1111-1120.

126. McHale SM, Shanahan L, Updegraff KA, Crouter AC, Booth A. Developmental and individual differences in girls' sex-typed activities in middle childhood and adolescence. Child Dev. 2004;75: 1575-1593.

127. Scott KP. Effects of an intervention on middle school pupils' decision making, achievement, and sex role flexibility. The Journal of Educational Research. 1984;77: 369-375.

128. Metton C. Pre/early adolescents' use of internet exploring social worlds from home. Reseaux. 2004;123: 59-84.

129. Stiles DA, Gibbons JL, Peters E. Adolescents' views of work and leisure in The Netherlands and the United States. Adolescence. 1993;28: 473-489.

130. McHale SM, Corneal DA, Crouter AC, Birch LL. Gender and weight concerns in early and middle adolescence: Links with well-being and family characteristics. J Clin Child Psychol. 2001;30: 338-348.

131. Munoz Boudet A, Petesch P, Turk C, Thumala A. On norms and agency. Conversations about gender equality with women and men in 20 countries. 2012.

132. Barker G. Engaging boys and men to empower girls: Reflections from practice and evidence of impact. Florence: UNICEF Innocenti Research Centre; 2006.

133. Bicchieri C. The grammar of society: the nature and dynamics of social norms. New York: Cambridge University Press;2006.

134. Bowleg L. The problem with the phrase women and minorities: Intersectionality—an important theoretical framework for Public Health. American Journal of Public Health. 2012;102: 1267-1273.

135. Hankivsky O. Women's health, men's health, and gender and health: Implications of intersectionality. Social Science & Medicine. 2012;74: 1712-1720.

136. Leaper C, Farkas T. The socialization of gender during childhood and adolescence. In: Grusec J, Hastings P, editors. Handbook of socialization: Theory and research. 2nd ed. New York: Guilford; 2014.

137. McCarthy K, Brady M, Hallman K. Investing when it counts: Reviewing the evidence and charting a course of research and action for very young adolescents. New York: Population Council; 2016.

138. Steinberg L, Morris AS. Adolescent development. Annu Rev Psychol. 2001;52: 83-110.

139. Brown BB. Peer groups and peer cultures. In: Feldman SS, Elliott GR, editors. At the threshold: The developing adolescent. Cambridge, MA, US: Harvard University Press; 1990: pp. 642.

140. Smetana J, Robinson J, Rote W. Socialization in adolescence. In: Grusec JE, Hastings PD, editors. Handbook of socialization: theory and research. Second edition. ed. New York: Guilford Press; 2015: pp. 60-84.

141. Mensch BS, Lloyd CB. Gender differences in the schooling experiences of adolescents in low-income countries: the case of Kenya. Studies in family planning. 1998;29: 167-184.

142. Svanemyr J, Amin A, Robles OJ, Greene ME. Creating an enabling environment for adolescent sexual and reproductive health: a framework and promising approaches. J Adolesc Health. 2015;56: S7-14.

143. UNESCO. International technical guidance on sexuality education: An evidence-informed approach for schools, teachers, and health educators. Paris: UNESCO; 2009.

144. UNFPA. Comprehensive sexuality education: Advancing human rights, gender equality and improved sexual and reproductive health. New York: UNFPA; 2010.

145. Haberland NA. The case for addressing gender and power in sexuality and HIV education: a comprehensive review of evaluation studies. Int Perspect Sex Reprod Health. 2015;41: 31-42.

146. WHO. Engaging men and boys in changing gender-based inequity in health: Evidence from programme interventions. Geneva; 2007.

147. Save the Children. Voices. Using testimonials to Influecing parent's support for very young adolescents' gender equality in Nepal. Save the Children; 2014.

Figure 3.1 Flowchart of the screening and study inclusion process

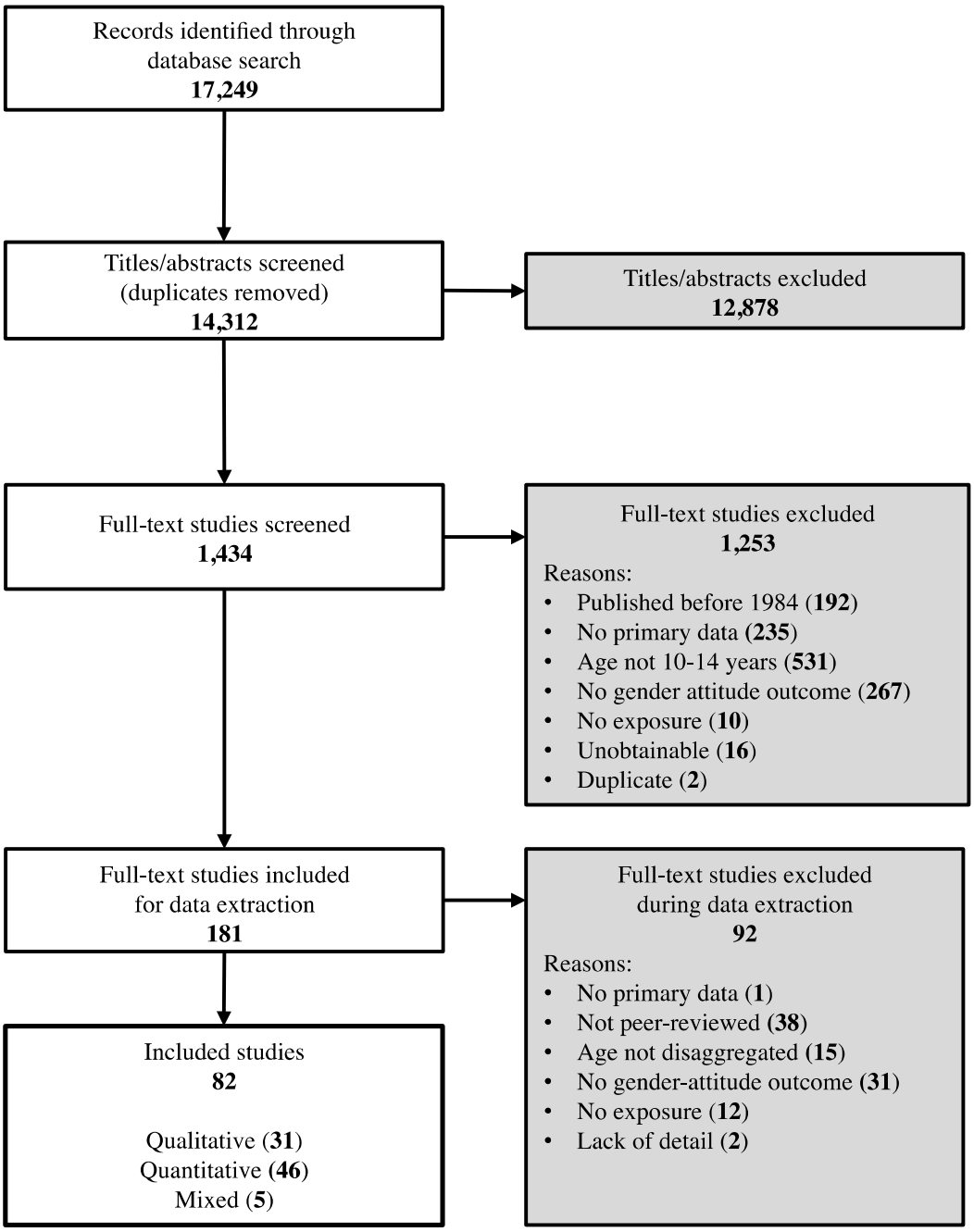


Table 3.1 Geographical distribution of the 82 included studies.

Region and Country	Nr of studies	References
North America	**50**	
Canada	2	[50,51]
United States	49*	[13,45-47,52-93]
Europe	**23**	
Belgium	1	[48]
Bulgaria	1*	[90]
Finland	1	[94]
France	2	[95,96]
Germany	2*	[48,97]
Great Britain	10*	[47,48,98-105]
Ireland	1	[106]
Italy	1*	[90]
Netherlands	1	[107]
Spain	1	[108]
Sweden	2*	[48,109]
Latin America and the Caribbean	**6**	
Barbados	1	[110]
Brazil	1	[111]
Honduras	1*	[49,112]
Mexico	3*	[46,113,114]
Sub-Saharan Africa	**5**	
Ghana	1	[115]
Nigeria	1	[116]
Malawi	1*	[49,112]
South Africa	1	[117]
Tanzania	1*	[49,112]
Middle East and North Africa	**3**	
Egypt	1*	[49,112]
Israel	1	[118]
Yemen	1*	[49,112]
Asia	**5**	
India	2*	[119,120]
Nepal	1	[121]
Singapore	1	[122]
South Korea	1	[123]
Oceania		
Australia	2	[124,125]
***Multi-country comparisons:**		
Italy, Bulgaria, US	1	[45]
Mexico, United States	1	[46]
Great Britain, United States	1	[47]
Belgium, Germany, Great Britain, Sweden	1	[48]
Egypt, Honduras, India, Malawi, Tanzania, Yemen	1	[49]

*These countries were part of multi-country comparisons in the studies listed at the end of the table.

Table 3.2 Thematic summary of quantitative studies

Variable	Nr of Studies	% of Quant. Studies	% Strong/ Moderate Quality [a]	Sign. Find.[b]	Mix Find.[b]	No Sign. Find.[b]	References
Individual level							
Biological sex	37	73%	65%	20	13	4	[45-47,51-53,55,58,59,63-70,73,75,78,81,85-89,91,95,96,107,109,110,116,118,121-123,125]
Ethnicity/race/immigration	5	12%	83%	3	1	1	[55,58,69,73,107]
Country comparisons	4	8%	50%	3	1	0	[45-47,110]
Age (within subject)	3	6%	100%	1	2	0	[59,65,77]
Pubertal development	2	4%	100%	1	0	1	[65,81]
Gender identity and traits	4	10%	50%	2	1	0	[65,73,74,89]
Romantic/sexual behavior	2	4%	100%	0	2	0	[63,108]
Interpersonal level							
Parental education/work (proxy for SES)	8	16%	75%	4	4	0	[51,63,81,86,89,91,97,109]
Parental attitudes	12	24%	58%	9	3	0	[52,54,59,62,72,74,75,81,86,97,107,109]
Parental gender roles	2	4%	100%	0	0	2	[52,109]
Sibling characteristics	5	10%	100%	0	5	0	[59,75-77,109]
Domestic violence	1	2%	100%	1	0	0	[119]
Peer pressure	1	2%	100%	0	0	1	[107]
Community/societal level							
School performance	4	9%	67%	1	2	0	[76,89,91,122]
Sexuality Education	3	6%	0%	3	0	0	[66,116,127]
Media	3	6%	100%	1	2	0	[56,58,89]

[a] Quality of studies refers to the proportion of studies exploring a particular variable that was rated as strong or moderate quality. For example, 65% of studies exploring differences in gender attitudes by biological sex were rated as strong/moderate quality.

[b] Number of primary studies that found a significant, mixed or no association with regards to the relationship between gender attitudes and the variable of interest.

Table 3.3 Summary of quantitative themes around factors associated with young adolescents' gender attitudes

Variable	Main Theme/Finding	Nr Studies Supporting Theme [a]	Quality of Studies	Examples of Study Findings	Contributing Studies
Individual level					
Sex	Gender attitudes vary by biological sex: girls more commonly than boys report equitable gender attitudes (or boys more commonly report inequitable attitudes)	20 of 37 that explored variable	4 strong, 10 moderate, 6 low	– US, strong quality: Girls had higher approval of equitable gender roles than boys [65]. – Netherlands, moderate quality: Boys were more likely than girls to express more negative attitudes towards gender non-conforming behavior and feel greater pressure from parents to conform to gender norms [107].	[47,52,53,55,59,65,68,70,75,81,85-89,91,107,109,118,123]
Ethnicity, Race and Immigration History	Gender attitudes appear to vary by race, ethnic and immigration history, but there is no clear trend in associations	4 of 6 that explored variable	1 strong, 3 moderate	– Netherlands, moderate quality: Children with "non-Western" backgrounds had more negative attitudes towards gay/lesbians, and gender non-conforming behaviors; and perceived higher parental pressure to conform to gender roles (especially boys) [107]. US, strong quality: African American participants chose larger ideal male and female figures than white participants in the United States [69].	[58,69,73,107]
Country comparisons	Gender attitudes appear to vary between countries, but there is no clear trend in associations	3 of 4 that explored variable	1 strong, 2 weak	– US and Scotland, strong quality: US participants held more traditional views towards male role norms compared to Scottish participants [47].	[45,47,110]
Age (within subjects)	Looking at longitudinal studies, gender attitudes appear to change as young adolescents age, but the patterns vary by subgroup.	3 of 3 that explored variable	2 strong, 1 moderate	– US, strong quality: From the 6th to 8th grade, girls increasingly approved of gender equality while boys became less approving [65]. – US, strong quality: Gender attitudes became less traditional between ages 7-13 and remained stable from ages 13-15. Patterns for some subgroups varied, for example by parental gender attitudes and sibling	[59,65,77]

Variable	Main Theme/Finding	Nr Studies Supporting Theme [a]	Quality of Studies	Examples of Study Findings	Contributing Studies
				characteristics [59].	
Pubertal status	Explored by two studies; no main theme identified.	N/A	1 strong, 1 moderate	– US, strong quality: Pubertal status was not associated with gender role attitudes [65]. – US, moderate quality: Paternal assessment of sons' pubertal age was associated with sex role attitudes such that more physically mature boys had less traditional attitudes [81].	[65,81]
Gendered traits and activities	Some indication of an association between gendered traits and attitudes. Three US-based studies showed that feminine traits and activities were associated with less stereotypical gender attitudes among boys, but associations among girls were not consistent.	3 of 5 that explored variable	1 strong, 2 moderate	– US, strong quality: Boys who described themselves as more feminine had more equitable gender role attitudes, while for girls no correlation was found [65]. – US, moderate quality: Boys' endorsement of feminine traits for self at baseline was associated with lower levels of sex typing of others at follow-up. For girls, interest in masculine-oriented activities was associated with less stereotypical attitudes towards others [73].	[65,73,89]
Romantic/sexual behavior	Explored by two studies; no main theme identified.	N/A	1 strong, 1 moderate	– Spain, strong quality: Intimate relationship experience predicted stronger endorsement of sexism among boys; results were mixed among girls [108]. – US, moderate quality: Sexual behavior was predictive of female stereotyping among girls but not boys. This relationship varied by race; sexual initiation was associated with an increase in stereotypical attitudes among African American but not White girls [63].	[63,108]
Interpersonal level					
Parental	Gender attitudes appear to be	9 of 11 that	1 strong, 4	– Sweden, strong quality: Parents' gender equality	[52,54,59,62,72

Variable	Main Theme/Finding	Nr Studies Supporting Theme [a]	Quality of Studies	Examples of Study Findings	Contributing Studies
attitudes	linked to mothers and/or father's gender-related attitudes and pressures. The nature of this association varies by biological sex.	explored variable	moderate, 4 low	attitudes were associated with girls, but not boys, own gender attitudes [109].	,74,75,77,81,86, 97,107,109,128]
				– US, strong quality: Traditional gender attitudes were associated with traditional parental attitudes. Both boys and girls with traditional parents displayed little change in attitudes over time [59]. US, moderate quality: For girls, mother's (not fathers) attitude towards male role was strongest predictor of reduced stereotypical attitudes [52].	
Parental education and work status (indirect measure of SES)	Gender attitudes appear to be associated with parental education level (especially mothers') and parental work status.	8 of 8 that explored variable	2 strong, 4 moderate, 2 low	– US, strong quality: For boys, mother's education and employment predicted gender stereotyping; stereotypes decreased with education and increased with employment [63]. – Sweden, strong quality: Higher maternal education was associated with boys and girls perceiving gender equality in the home as very important. For girls, this was also related to mother working full-time outside of the household [109]. – Germany, moderate quality: Higher SES families expressed more equitable gender role orientations [97].	[51,63,81,86,89 ,91,97,109]
Parental gender roles in the home	No evidence that parental gender roles in the home are associated with child's gender attitudes.	2 of 2 that explored variable	1 strong, 1 moderate	– Sweden, strong quality: There was no relationship between mother's time doing housework and gender attitudes [109]. – US, moderate quality: Sex role attitudes were not associated with fathers' participation in household work [52].	[52,109]
Sibling characteristics (sex, birth order	Gender attitudes appear to be associated with sibling dyad composition (age, sex, attitudes	5 of 5 that explored variable	2 strong, 3 moderate	– US, moderate quality: Having a younger brother was associated with stereotypical gender attitudes among	[59,75-77,109]

Variable	Main Theme/Finding	Nr Studies Supporting Theme [a]	Quality of Studies	Examples of Study Findings	Contributing Studies
and gender attitude of sibling)	of siblings); associations vary by sex.			firstborn girls. Sibling attitudes negatively predicted stereotypical attitudes over time [77]. – Sweden, strong quality: First- and second-born siblings had different gender attitude patterns. Firstborn boys were more stereotypical if they grew up with a male sibling. For girls the same was true, but with older brothers. In contrast, stereotypical attitudes among second-borns with older brothers declined over time [109].	
Domestic violence	Explored by one study; no main theme identified.	N/A	Moderate	– India, moderate quality: Boys were more likely to condone violence against girls if they witnessed inter-parental violence, and were victims of violence in the home [119].	[119]
Perceived peer pressure	Explored by one study; no main theme identified.	N/A	Moderate	– US, moderate quality: No association between peer pressure to conform to gender norms and reported gender attitudes [107].	[107]
Community/Societal level					
Academic success/ performance	Limited evidence that higher academic achievement is associated with more liberal gender attitudes.	3 of 3 that explored variable	2 low, 1 moderate	– US, moderate quality: Participants with higher reading level gave less stereotyped responses [89]. – US, low quality: School test scores were positively correlated with equitable gender attitudes [91]. – Singapore, moderate quality: students at highly selective ("elite") schools held more equitable gender attitudes compared to students not in such schools [122].	[89,91,122]
Sex education	Evidence suggests that exposure to sex education curricula is associated with more equitable gender attitudes, though studies are all	3 of 3 that explored variable	Low	– US, low quality: Participants in a school-based sex education intervention expressed less traditional attitudes toward women [66]. Nigeria, low quality: Gender equitable attitudes increased over the course of a school year during which	[66,116,127]

Variable	Main Theme/Finding	Nr Studies Supporting Theme [a]	Quality of Studies	Examples of Study Findings	Contributing Studies
	quasi-experimental and of low quality.			a Family Life and HIV Education curriculum was implemented [116]. – U.S, low quality: Participation in the "Fair Play" curriculum was associated with less stereotypical perceptions of occupational, school, and family roles [127].	
Pornography or sexually explicit media	Some indication that viewing sexually explicit media or pornography is linked to more stereotypical gender attitudes.	2 of 3 that explored variable	1 strong, 1 moderate	– US, strong quality: Adolescents who used sexually explicit media had less progressive gender attitude. Boys were more likely than girls to use such media. In adjusted analysis, media was only predictive of gender role attitudes among girls [56]. – US, moderate quality: Viewing pornography was related to rating female promiscuity and male dominance as perceived causes for rape. The more girls (but not boys) believed to have learnt from pornography, the higher the score of reported stereotypical attitudes about rape causes [58].	[56,58]

[a] Number of studies supporting the identified theme, out of all studies that explored that particular variable. For example, 37 studies explored gender attitudes differences by sex, and 20 found and that attitudes differ between boys and girls (i.e. 20 studies supported this theme).

Table 3.4 Thematic synthesis of qualitative studies

Ecological Level	Analytical Theme	Descriptive Theme	Contributing Studies
Individual level	Gender attitudes differ by biological sex.	Girls, more commonly than boys, challenge gender inequalities.	[46,48,50,57,60,61,82-84,92,100-102,104,115,117,121,124]
		Boys appear to face more social barriers than girls to challenge gender inequalities.	[50,60,84,93,94,99,102,115,116,121,124]
	Gender attitudes intersect with the construction of norms about other social and cultural categories.	Gender norms intersect with race/ethnicity norms and identities.	[82,93,99,103]

		Young adolescents of immigrant background experience clashing cultural messages about gender norms.	[46,60,79,84,93,99,100]
		Social class may influence the gendered opportunities available to young adolescents.	[61,98,100,102,103,106,114]
	Pubertal onset brings new gender pressures and expectations.	With the onset of puberty, boys are expected to prove masculine toughness and sexual prowess.	[79,114,117]
		With the onset of puberty, girls are expected to deemphasize physical body changes, and are increasingly restricted.	[79,82,100,117]
Interpersonal level	Parents and other family members communicate gender norms overtly and covertly.	Young adolescents learn about gender role expectations in the home.	[60,106,111,114,115]
		Mothers appear to be especially important in teaching and enforcing stereotypical gender norms.	[60,82,84,100,111,115]
	Parents strictly control and sanction their daughters.	Tough parental control and restrictions for girls, often tied to concerns about female sexuality.	[60,82,84,92,98,100,102,106,111,115,117,121]
	Peers are central in establishing and upholding gender norms.	Male peer groups enforce competition, toughness and heterosexual prowess.	[61,79,80,84,103,104,111,113,114,117,128]
		Boys who fail to achieve local masculinity standards are bullied and ridiculed by their peers.	[48,61,71,79,80,83,84,93,101,105,111,113,114,117,124]
		Female peer groups enforce norms of beauty, appearance and heterosexual romance.	[57,61,82,84,98,99,101,104,111]
		Peers police gender boundaries related to female sexuality.	[94,98,99,101-103,113,114]
		Girls experience control and exclusion by male peers.	[49,61,92,94,99,105,112,128]
Community/Societal level	Schools communicate and uphold gender norms through rules, activities and teacher-student relationships.	School cultures, traditions and rules contribute to the upholding of gender norms.	[57,61,83,84,98,100,105,106,124]
		Schools appear to disproportionally favor boys' activities and performances.	[61,84,90,92,93,100,105]
		Teachers reinforce stereotypical gender norms.	[60,79,80,83,90,94,98,104,105]
	Media appears to shape gender attitudes in various ways.	Different media appear to influence young adolescent's gender attitudes.	[48,50,79,114,124]

	Gender attitudes are constructed through social media and sexting.	[103,128]

Table 3.5 Summary of qualitative themes around young adolescents' construction and negotiation of gender attitudes

Review Finding/Theme	Illustrative Quote	Confidence in the Evidence	Explanation of Confidence Assessment	Contributing Studies
Individual level				
Girls, more commonly than boys, challenge gender inequalities. Studies across the world showed that girls commonly challenge gender stereotypes and inequalities. In studies from Nepal, Mexico and the US, girls voiced the importance of gender equality in the household, and in the US and Great Britain, girls rejected pressures to conform to "hyperfeminine" norms. Latina and African American girls in US-based studies rejected adult attempts to control their sexuality, and in a South African study girls offered strong critique of men's violence against women. Similarly, in one study based in Ghana found that girls emphasized women's rights to relationship power.	– *If I were a guy I'd be treated differently and I told [my family] you know what I don't care because I'm a girl. If you wanted a guy, why don't you go have another kid or something.* (Mexican-American girl, US) [60] – *There's not really girls' jobs or boy's jobs. You can get whatever job you really want to get.* (Girl, Australia) [124]	High confidence	18 studies of mainly strong or moderate quality and relevance. Thick and coherent data from 11 high, middle and low-income countries across different geographical regions.	[46,48,50,57,60,61,82-84,92,100-102,104,115,117,121,124]
Boys appear to face more social barriers than girls to challenge gender inequalities. Findings from across the world indicated that it might be more difficult for young adolescent boys (than girls) to express gender equitable attitudes and challenge inequalities. Studies from the US, Finland, Nepal and Great Britain showed that while it is generally ok for girls to challenge gender norms, boys who do not conform to local masculinity stereotypes	– *[If I were a girl] I wouldn't feel as many pressures from other people from the same gender—boys are more likely to single out and make fun of those who do not fit those perceptions of "coolness".* (Chinese-American boy, US) [84]	High confidence	11 studies of moderate quality and high relevance. Thick, coherent data across high and low-income countries in different geographical regions.	[50,60,84,93,94,99,102,115,116,121,124]

Review Finding/Theme	Illustrative Quote	Confidence in the Evidence	Explanation of Confidence Assessment	Contributing Studies
are socially stigmatized. In studies from Ghana, Nigeria, Australia, Canada, Great Britain and the US boys reported more freedom and opportunities than girls, indicating a lack of motivation to challenge prevailing norms that are benefitting them (as boys).	– *Interviewer: Would you change things? Boy: It's good for us innit?! We're lads! So (…) it's all right for us but I think I quite I feel the women would wanna change it.* (Asian boy, England) [99]			
Gender attitudes intersect with race/ethnicity norms and identities. Young adolescents in studies from the US and Great Britain constructed racial masculinities and femininities. For example, Asian boys of Muslim origin in a study from England constructed different masculinity norms for White and Black boys, and in a US-based study Latina and African-American girls expressed different femininity ideals.	– *But then again if you do summit and they get a beating then you get the blame for it, even if they started it nah-jus' can't beat the white guy; the White guy is alright, the black lad's messed up*. (Asian boy, England) [113]	Low confidence	4 studies of moderate quality and high relevance. Less coherent data limited to 2 high-income counties in Europe and North America.	[82,93,99,103]
Young adolescents of immigrant background experience clashing cultural messages about gender norms. Studies from the US and Great Britain described how young adolescents of immigrant background experience clashing gender expectations between their country of origin and their new society. For example, studies from the US found that Chinese-American girls were in a "double-bind" when trying to meet high academic expectations from parents while displaying academic ignorance with peers at school; and that girls of Mexican-American origin were strictly controlled by parents who feared that their daughters would become "promiscuous" because of the sexual freedom	– *The concept of being popular is different in China and in America. In America, a very popular girls isn't much different from a female gangster. Do you want us to become female gangster?* (Chinese-American girl, US) [84]	High confidence	7 studies of mainly strong or moderate quality. Thick data from 2 high-income and 1 middle-income country, mostly coherent findings across sites although some details are context specific.	[46,60,79,84,93,99,100]

Review Finding/Theme	Illustrative Quote	Confidence in the Evidence	Explanation of Confidence Assessment	Contributing Studies
in the US. In England, one study found that young Muslim boys constructed gender identities in opposition to "Western" masculinities, and Muslim immigrant girls experienced greater parental restrictions on their mobility and freedom than native girls.	*– Interviewer: I've noticed that a few girls here don't wear dibuka [hijab] (...) Boy: You know, they don't really take Islam seriously, like they've got a taste of, um, it's like they've got higher status over here and they don't really care.* (Muslim boy, England) [99]			
Social class may influence the gendered opportunities available to young adolescents. In studies from Great Britain and Ireland, girls distinguished between working-class and upper-class femininities, for example by emphasizing the need to be a (respectable) "lady" in contrast to (unrespectable) "townie" girls. In a US-based study branded clothing was an important part of constructing middle-class femininities, while toughness generated higher social status among working-class girls. One Mexican study highlighted difficulties for boys to meet prevailing machismo norms (e.g. working to provide for the family) given their low socioeconomic status.	*– The girls told me that they had recently attended a school disco where some girls from a "less selective" school had been able to attend (...) In hushed tones, the girls told me that to their horror they had found a condom in the girls' toilets and that "it could not possibly have belonged to anyone from their school" for they "would never be so common".* (Girls at upper-class school, England) [98]	Moderate confidence	7 studies of moderate quality and relevance. Fairly thick and coherent data from 3 high-income countries and 1 middle-income country in Europe, North America and LAC.	[61,98,100,102,103,106,114]
With the onset of puberty, boys are expected to prove masculine toughness and sexual prowess. For some boys in US-based studies, puberty implied an increased need to display and prove toughness and physical strength; traits that they associated with adult manliness. In a South African study, boys were taught	*– The boys made public declarations of manliness whenever they successfully used their bodies to best others. On average, there*	Low confidence	2 studies of strong quality, high relevance. Fairly thick data with low coherence limited to	[79,114,117]

Review Finding/Theme	Illustrative Quote	Confidence in the Evidence	Explanation of Confidence Assessment	Contributing Studies
how to be men through circumcision rites, which emphasized their readiness and biological need to have sexual intercourse. In a Mexican study boys associated pubertal development both with sexual readiness but also with increased need to provide for their families.	*were six brash moments, like "I'm a man" or "I'm the man", per day of observation*. (Observation of boys, US) [79] *– If you are not circumcised it is a bit difficult because your "non" [penis] will still be having the cap (…) but when you are circumcised it's easy, it fits, it is sharp and it is in.* (Boy, South Africa). [117]		2 high-income and 1 middle-income country in North America and Sub-Saharan Africa.	
With the onset of puberty, girls are expected to deemphasize physical body changes, and are increasingly restricted With the onset of puberty, some girls in studies from the US and Great Britain experienced increased restrictions in their freedom/mobility as they were expected to assume adult (mature) femininity roles. Girls in these high-income countries were overall encouraged by others to deemphasize their physical and sexual development so as not to attract and lure boys and men. So too, girls worried about increasing pressures to act like girls and no longer be able to do "boys" activities as they entered puberty.	*– I might change because my mum won't let me play football because you're grown up and you're playing baby stuff and all that stuff (…) You can't really play football because it's just a bit weird playing with the boys…* (Girl, England) [100]	Low confidence	3 studies of moderate quality, high relevance. Moderately thick data but findings are context specific and limited to 2 high-income countries in Europe and North America.	[79,82,100,117]
Interpersonal level ***Young adolescents learn about gender role expectations in the home.*** Studies indicated that girls and boys learn about gender roles in the home through indirect and direct messages from parents and other family members. In studies from Ireland, Ghana and Brazil, girls mentioned that they (in contrast to boys) were expected to take care of the home and younger	*– A girl stated: "My mom is afraid of my dad" (…) She told us a story about when her mother got a job at a restaurant, she was told by her husband that she was not allowed to work.* (Mexican-American girl, US)	Moderate confidence	5 studies ranging from mainly moderate and strong quality and high relevance. Somewhat thick data from 5 countries of varying	[60,106,111,114,115]

Review Finding/Theme	Illustrative Quote	Confidence in the Evidence	Explanation of Confidence Assessment	Contributing Studies
siblings. Young adolescents in Ghana were also taught to distinguish between the status and sanctions associated with female (cooking, caretaking) and male (physical/technical) household tasks. In one US-based study, girls learnt that fathers control mothers by observing domestic violence in the home.	[60] *– It is the woman's responsibility to care for the children because the man provides the money. When the couple is about to marry the family members state these things to them.* (Boy, Ghana) [115]		income levels in different geographical regions.	
Mothers appear to be especially important in teaching and enforcing stereotypical gender roles. Studies from across the world described how mothers play a central role in reinforcing gender norms messages, especially to their daughters. In studies from the US and Great Britain, girls learnt from their mothers about what it means to be a woman and to stay away from men once their bodies start to change. Mothers in a Brazilian study taught their daughters to fear male sexuality and aggression, while in a study in rural Ghana girls learnt from their mothers that women should be deferent and passive in relation to men. In studies from US and Ghana, young adolescents also mentioned that they typically turn to mothers because of their fathers' limited availability.	*– It's really hard I can't talk to my dad about anything, he either yells too much or he takes it the wrong way. It's like, there's these old Mexican men, they're really strict about everything.* (Mexican-American girl, US) [60] *– I have learnt from my mother that when a woman is talking to a man she talks in an apologetic manner.* (Girl, Ghana) [115]	Moderate confidence	6 studies of mainly moderate or strong quality and high relevance. Fairly thick data from 4 high, middle and low-income countries in different geographical regions.	[60,82,84,100,111,115]
Tough parental control and restrictions for girls, often tied to concerns about female sexuality. Studies across the world described how parents	*– Sometimes I wish I was like my*	High	10 studies of mainly	[60,82,84,92,98-

Review Finding/Theme	Illustrative Quote	Confidence in the Evidence	Explanation of Confidence Assessment	Contributing Studies
employed a wide range of strategies to control daughters, including the control of a girl's engagement in "boys' activities", and school choices. Control and sanctions were often related to parental attitudes and concerns about sexuality and girls' changing bodies. Girls described parents' efforts to control or punish their relationships with boys, as well as their movement and appearance outside of the household. One study in Ghana highlighted how girls received stricter sanctions for pre-marital pregnancy, and in another study in England, Muslim boys saw themselves as "protectors" of their sisters' sexual "respectability", involving the control of their sisters mobility and appearance.	*brother because my dad lets him do everything. It's not because he's older, because when my brother was my age my dad let him go everywhere by himself. And with me, no. Guys can't get pregnant, guys can't do this, guys can't do that, but girls…* (Mexican American girl, US) [60] *– She wanted to race snowmobiles and her dad would only let her if she like covered up her whole face with a mask (…). So nobody saw her cause her dad didn't think it was a sport for girls*. (Boy, US) [92]	confidence	high or moderate quality and relevance. Thick and coherent data from 4 high/middle-income and 2 low-income countries in different geographical regions.	100,102,106,115,117,121]
Male peer groups enforce competition, toughness and heterosexual prowess. Studies from the US and England showed how male peers' pressured each other to engage in various forms of physical (athletics/sports activities and fighting) and verbal challenges (banters, teasing) as a way of proving masculinity. Similarly, low-income boys in studies from Mexico and Brazil demonstrated their toughness through risk-taking practices such as heavy drug use. Across the world, male peer groups encouraged (early) sexual wooing of (many) girls as a way to display masculinity.	*– Santiago and James arm wrestle. James loses. Santiago screams to James "You're a woman!" Santiago and James laugh. Brandon says to James, "Until you don't [sic] beat him you're a woman".* (Observations of Mexican-American boys, US) [79]	High confidence	12 studies of mainly high or moderate quality and relevance. Thick and coherent data from 10 high and middle-income countries in different geographical regions.	[61,79,80,84,103,104,111,113,114,117,128]
Boys who fail to achieve local masculinity standards are bullied and ridiculed by their peers.				

Review Finding/Theme	Illustrative Quote	Confidence in the Evidence	Explanation of Confidence Assessment	Contributing Studies
Studies from different geographic regions found that boys harassed and expressed homophobic attitudes towards peers that did not meet prevailing hegemonic heterosexual masculinity norms. Common examples included public embarrassment of physical weaknesses, homophobic commentaries. Male peers commonly used ironic humor to enforce hegemonic masculinity, for example by "jokingly" calling each other "gay", "faggots", "pussies" or "bitches".	– *Most of the time boys will tell you that if you don't approach a girl and tell her that you love her, it means you have been bitten by a mouse, that you are a coward. They say you are burning, you are afraid of girls (…) and the fact that you are scared of girls means there is something that you are scared of – you are scared of sex.* (Boy, South Africa) [117]	High confidence	16 studies of mainly high or moderate quality and relevance. Thick and coherent data from 10 countries of varying socioeconomic status.	[48,61,71,79,80,83,84,93,101,105,111,113,114,117,124]
Female peers enforce norms of beauty, appearance and heterosexual romance. Female peer groups in studies from the US and Great Britain constructed femininity norms through repeated remarks on the importance of being a "girly" girl, defined as slim, beautiful and sexually attractive (to men). Heterosexual romance was central to the construction of femininity across both these countries as well as in a study from Brazil where girls constantly evaluated each other's popularity with boys.	– *Frankie had been accepted into the girly girl group because of her popularity with a number of boys. By having a relationship with a boy, Frankie was fulfilling a dream that many of the girls hoped for themselves*. (Observations of girls, England) [98]	High confidence	9 studies of mainly high and moderate quality and relevance. Thick and coherent data across 2 high and 1 middle-income country in Europe, North and South America.	[57,61,82,84,98,99,101,104,111]
<u>Peers police gender boundaries related to female sexuality.</u> Girls in studies from Great Britain, Finland and Mexico mentioned experiences of peer harassment and shaming/policing related to their appearance and sexuality. For example, girls regarded as "too" sexual ('bad girls') were shamed through "slut-calling" and sexist comments by both male and female peers. In the Mexican study, female peers also stigmatized and teased girls that they perceived to be (or act) homosexual.	*Girl: "I think a bit of tart is alright… I mean you want to look good." Friend: "Yes, you want to look good… but no tart is never alright"* (Girls, England) [98] – *I felt comfortable just wearing T-*	Moderate confidence	8 studies of mainly moderate quality and relevance. Fairly thick data from 2 high and 1 middle-income countries in Europe and LAC.	[94,98,99,101-103,113,114]

Review Finding/Theme	Illustrative Quote	Confidence in the Evidence	Explanation of Confidence Assessment	Contributing Studies
	shirt… and boys [would] tell me, "Why are you coming to school like that?" (Girl, US) [82]			
<u>Girls experience control and exclusion by male peers.</u> Studies from studies across the world indicated that young adolescent boys exercised control over female peers in various ways. Girls in the US, Great Britain Honduras and Egypt described how boys hindered their participation in physical activities such as soccer games. In Finland, some girls mentioned how male peers prevented them from voicing their opinion at school.	*– They say we're not for playing football because we're girls and we make so many mistakes because we are weak.* (Girl, Honduras) [112] *– Say a girl was really, really good at football, and she was showing them up (…) then [the boys] might not like her… Yeah, 'cause if they were better, if they were worse, they'd tease them.* (Group of Chinese-American boys, US) [92]	High confidence	7 studies of ranging from low to high quality. Fairly thick and coherent data from 10 high and low-income countries in different geographical regions.	[49,61,92,94,105,112,128]
Community/Societal level				
School cultures, traditions and rules contribute to the upholding of gender norms. Studies from the US, Great Britain, Ireland and Australia indicated that schools are important institutions when it comes to both regulating and upholding gender norms through different traditions and cultures. Examples included the enforcement of school uniforms, policing of girls clothing and the attribution of higher status to boy's activities and performance.	*– I got to the gates and I was called back by Mrs. Fairhead. She asked me why I thought I could go home in my netball skirt and said that I shouldn't do this… I should not be seen to be dressed like this by people from outside of the school, I could run into builders and perverts on the way home and everything!* (Girl, England) [98]	Moderate confidence	9 studies of moderate quality and relevance. Fairly thick and coherent data across 4 high-income countries in Europe, North America and Oceania.	[57,61,83,84,98,100,105,106,124]
Schools appear to disproportionally favor boys'				

Review Finding/Theme	Illustrative Quote	Confidence in the Evidence	Explanation of Confidence Assessment	Contributing Studies
activities and performance. In studies from the US and Great Britain, school sports and physical activities promoted stereotypical masculinity norms and the pressure on boys to participate and perform well in sports such as football was strong. For boys in a study from Great Britain, football provided an opportunity to "practice " being (adult) men, and in the US boys who did not perform well in physical activities were marginalized. In a US-based study, "feminine" activities such as cheerleading emphasized attractiveness rather than physical performance.	– *The teacher gets mad at me for forgetting my (gym) clothes and calls me a liar when I say I don't feel good. This happens in front of my class-mates, and (…) I don't want them to know I'm trying to get out of it, because most boys like sports.* (Boy, US) [90]	Moderate confidence	7 studies of moderate quality and high relevance. Somewhat thick and coherent data across two high-income countries in Europe and North America.	[61,84,90,92,93,100, 105]
Teachers reinforce stereotypical gender norms. According to studies conducted in Western Europe and the US, teachers enforced femininity norms at schools in various ways. Examples included teachers socializing girls to act 'lady like' at an upper-class school in England, teachers giving less attention to girls compared to boys, undermining girls abilities and strength, or ridiculing boys that lack typically masculine characteristics.	– *During a lesson when some of the boys were continually commenting on the behavior of some of their female classmates, the teacher joked, "This is how the strong Finnish women develop: they survive by being teased!"* [94](Finland) – *The guy teachers are, I guess they're not girls so they tend to think that stuff's harder for girls than guys like at sports, but it isn't true*. (Mexican-American girl, US) [60]	High confidence	9 studies of mainly high or moderate quality, and high relevance. Fairly thick data across 3 high-income countries in Europe and North America.	[60,79,80,83,90,94,9 8,104,105]
Different media appear to influence young adolescent's gender attitudes. Young adolescents in studies from high-income countries described how various media (TV, popular culture, comic books, music, video games and advertisements) influenced their perceptions of	– *I don't know we always hear about it on the news when the man pressures the woman into doing something. But we never really hear*	Low confidence	5 studies of moderate quality and relevance. Thin and context specific data from 8	[48,50,79,114,124]

Review Finding/Theme	Illustrative Quote	Confidence in the Evidence	Explanation of Confidence Assessment	Contributing Studies
masculinities and femininities. Examples included stereotypical TV portrayals of men as perpetrators of violence and women as victims, the admiration of rappers from violent neighborhoods, communication of sexual and gender norms through media campaigns and heteronormative portrayals in comic books.	*it that the woman's doing something to the man.* (Girl, England) [48]		countries in high-income settings (Europe, North America, Oceania).	
<u>Gender attitudes are constructed through social media and sexing</u> In Great Britain, one study found that exchanges of sexual pictures were important strategies for boys to display masculinity, and for girls to prove femininity (attractiveness) while at the same time not appearing too slutty. A study in France found that online social networks presented opportunities for boys and girls to explore alternate gender identities and norms by pretending to be someone else online.	*– Interviewer: How does like all this sending of pictures and stuff relate to like having sex and doing stuff? Boy: because if a girl sends a picture to you it means that she probably wants to meet up with you and stuff.* (Boy, Wales) [103].	Low confidence	2 studies of moderate or low quality, and moderate relevance. Relatively thin data from two high-income countries in Europe.	[103,128]

Chapter 4 (Manuscript II) :

"Inexperienced"? Exploring patterns in romantic and sexual activities among urban poor young adolescents in Nairobi, Kenya

ABSTRACT

Background: The need for early prevention approaches to improve adolescent sexual and reproductive health and rights (SRHR) in sub-Saharan Africa is gaining increased attention, yet little is known about the sexual experiences of very young adolescents (VYA) in the region.

Methods: This study used cross-sectional survey data collected from 11-14 -year-olds in the Korogocho slum of Nairobi to describe the prevalence and patterns of romantic and sexual activities. The final analytical sample comprised 365 never-married VYA (50% boys) who responded to a survey administered via computer-assisted personal interviews. Latent class analysis was used to identify sub-groups of VYA based on self-reported awareness about sex and involvement in various romantic and sexual activities. Multivariate latent class regression models were used to examine the individual, familiy and community-related characteristics of each identified sub-group.

Results: The mean age of respondents was 12.4 years; most (98%) were enrolled in school. The prevalence of romantic and sexual activities was relatively low but varied by type of activity; 16% had liked someone 'as more than friends' and all together one in six respondents reported some form of non-coital or coital sexual activity. Latent class analysis revealed three distinct romantic and sexual experience sub-groups: *Involved* (12%, high probability of being aware of sex and to have engaged in romantic and sexual activities); *Observant* (48%, high awareness but little own experience); and *Naïve* (40%, little awareness or personal experience). Involved VYA were more likely to be older, having started puberty, to be orphans, and to live in households of greater relative wealth.

Class membership was not associated with sex, being born in Korogocho, household size or people sharing a sleeping space, sibling dyad, or neighborhood social control.

Conclusion: Findings suggest that while most VYA in Nairobi slums have not initiated romantic and sexual activities, there are distinct sub-groups of adolescents who would not have been captured by looking only at the prevalence of single indicators (e.g. vaginal sex). Research and programming aiming to improve adolescent SRHR thus need to use a wider range of measures to understand and characterize the emerging sexual experiences and needs of VYA.

INTRODUCTION

The strategic value of investing in the sexual and reproductive health and rights (SRHR) of very young adolescents (VYA) aged 10-14 years in low- and middle-income countries is gaining increasing attention [1-4]. Yet, in sub-Saharan Africa – a region heavily burdened by HIV/AIDS, child marriage, early pregnancy and unsafe, clandestine abortion – relatively little is known about the sexual experiences of VYA even though it is in this age group that risks for many adverse SRHR outcomes emerge and opportunities for the formation of healthy sexuality are the greatest [1,2,5-7]. Indeed, with the onset of secondary sex characteristics young people are increasingly viewed as sexual beings; and it is a time when many start to explore sexual feelings, attractions and relationships [1,7].

While adolescent sexual development (and with it partnered sexual activities) is a progressive process, most research to date has classified adolescents as sexually "experienced" (or not) based on a single report of penile-vaginal intercourse. [8-12]. This dichotomized measure is problematic as it fails to take into account the multidimensional nature of adolescent sexual relations, such as sexual feelings, awareness, romantic (e.g. having a boy/girlfriend) and non-coital (e.g. holding hands, hugging, kissing, touching) activities, as well as vaginal, oral and anal sex [1,8,9,11,12]. Evidence from across the world including sub-Saharan Africa indicates that VYA are engaging in a wide range of intimate activities even if they report never having had (vaginal) sex [1,5]. For example, in a longitudinal study conducted in Nairobi with over 2,000 12-19 -year-olds, about one in ten of those who said that they had not had sexual intercourse (mean age 14) had kissed, fondled or engaged in heavy petting [13]. Similarly, a study of nationally representative samples of over 8,000 12-14 -year-olds in sub-Saharan Africa found that

almost one third of respondents in Malawi and Uganda and one in ten of in Burkina Faso and Ghana reported some form of romantic or sexual experience (boy/girlfriend, kissed, fondled or intercourse) [14].

Measuring experiences beyond vaginal sex is important as such data can provide useful insight into adolescents' future sexual risk and well being [9,12,15]. Even though most adolescents follow a gradual unfolding of sexual experiences from less to more intimate activities, research indicates that a quick progression through romantic and sexual behaviors may result in earlier timing of first sexual intercourse [12], and a "non-linear" pattern (e.g. starting with intercourse) has been associated with higher sexual risk including STI diagnosis and concurrent partners [10].

In addition, a growing body of research suggests that SRHR risk factors differ across more nuanced *typologies* or sub-groups of adolescents based on their patterns of romantic and sexual activities [8-11,16]. In one of the earliest typology frameworks described, Miller et al. classified a sample of U.S. adolescents aged 14-16 into five groups: 1) *delayers* (37%, never had vaginal sex and did not expect doing so in the next year); 2) *anticipators* (22%, never had vaginal sex but expected doing so in the next year); 3) *one-timers* (5%, had vaginal sex once); 4) *steadies* (8%, had vaginal sex multiple times with the same partner); 5) *multiples* (28%, had vaginal sex multiple times with different partners). Among those who had not initiated sexual intercourse, anticipators were more likely than delayers to have engaged in non-coital activities [11]; and a subsequent study using the same data found that anticipators had a greater number of social, psychosocial and risk behavior factors. Specifically, anticipators were more

likely to report substance use, poorer mental health including lower self-esteem and control, and less parental support, compared to peers without such expectations [8].

Attempts to distinguish romantic and sexual experience typologies have become increasingly refined with the use of cluster-based approaches such as Latent Class Analysis (LCA). For example, Hipwell and colleagues [15] used LCA to explore past-year non-coital sexual behaviors among 12-year-olds girls in the U.S., revealing three distinct groups: *no* (48%), *mild* (46%, spending time along, holding hands, hugging, kissing) and *moderate* (6%, laying down together, touching on/under clothes, oral sex) experiences. The moderate group was more likely to report alcohol use, deviant peer behaviors, high impulsivity, early onset of menarche, and poor parental communication.

However, most typologies of adolescent romantic and sexual experiences were developed in the US or Western Europe and less is known about patterns of sexual experiences among VYA in low- and middle-income countries. Additionally, most were validated with older adolescents or did not report age-segregated results. Many of the studies also used school-based samples thereby failing to capture out-of-school adolescents who may have higher prevalence of sexual behaviors [13].

This study fills some of the above gaps in research by describing the prevalence and patterns of romantic and sexual experiences among VYA in a Nairobi slum, Kenya. The study extends previous research on early adolescent SRHR in two important ways. First, it uses LCA, which allows combining various indicators so as to identify sub-groups of VYA who share similar response patterns. Secondly, it focuses on VYA in urban slums for whom little data is available even though evidence suggests that compared with peers in non-slum areas, adolescents who grow up in slums have earlier

sexual debut [13,17], higher risk of unintended pregnancy, early childbearing and STIs including HIV [18]. A better understanding of the unfolding of romantic and sexual behaviors among VYA in urban slums can inform the design of effective "upstream" SRHR interventions to promote sexual well-being and target young people before they engage in or are exposed to risky sexual practices [7].

The study has three aims. First, it describes the prevalence and circumstances of romantic and sexual experiences among VYA aged 11-14 years in a Nairobi slum. Second and most centrally, it seeks to develop an inductive typology of romantic and sexual experiences in this population. Finally, it examines the characteristics of the different typology groups focusing on individual, interpersonal and community-level factors that in line with an ecological framework [19] may influence timing of first sex.

METHODS

Participants

Data were collected as part of the Kenyan arm of the 15-country Global Early Adolescent Study (GEAS) (www.geastudy.org). The overall goal of the GEAS is to understand how gender attitudes and a range of sexual and other health outcomes unfold among adolescents in urban poor settings. Participants were recruited using the Nairobi Urban Health and Demographic Surveillance System (NUHDSS) [20]. The minimum sample size needed to conduct analysis in relation to the study aims was determined to 400, and inflated to 550 anticipating at least 20% non-response. A NUHDSS list of 3,042 10-14 -year-old males and females residing in Korogocho was obtained, from which a random sample of 550 adolescents stratified by age and sex was selected. Adolescents were considered eligible for interview if they had not out-migrated or died at time of survey.

However, data collection with 10-year-olds was suspended about halfway through the fieldwork due to their difficulties understanding and completing the interviews (58 adolescents aged 10 years were interviewed). In order to retain the analytical power, we expanded the sample list to 630 (n=504 aged 11-14 years) of whom 424 were interviewed (n=366 11-14 -year-olds). Of the 11-14 years not interviewed (n=138), 67 had moved out of the NUHDSS and one adolescent had died, leaving an actual response rate of 84% in this age group (366/423 eligible for interview). Lack of consent/assent or that the adolescent could not be located (e.g. boarding school, away for the holidays) were the main reasons for non-response. One respondent was excluded because of poor data quality. The analytical sample therefore consisted of 365 adolescents aged 11-14 years.

Procedures

Data collection began in November 2015 and concluded in February 2016. Trained local data collectors of the same sex as the adolescent interviewed the respondents using tablets programmed with a mobile technology platform called SurveyCTO (Version 12.2) [21]. All interviews were conducted at a secure, private location (a local school) either in Swahili or English. The adolescent questionnaire collected information on a wide range of domains including physical and mental health, romantic and sexual experiences, gender attitudes, violence and a number of background variables related to individual, family, peer, school, neighborhood, and media characteristics. In addition, parents/guardians completed a brief household survey with details on the household structure, education and employment. The study site and data collection procedures have been described in detail elswhere (Chapter 2).

The study was approved by the Johns Hopkins Bloomberg School of Public Health Institutional Review Board, the WHO Ethical Review Board, and by the AMREF Health Africa Ethics and Scientific Review Committee. Written informed parental/guardian consent and adolescent assent were obtained prior to the interviews.

Measures

Outcome variables

Romantic and sexual experiences were assessed through a series of questions derived from measures that have shown high reliability and validity in past research with VYA [10-12,16,22-24]. Respondents were asked about their awareness of sexual activities (whether they knew what kissing, fondling and sexual intercourse is), if any of their same-aged friends engaged in those activities, and whether they ever watched pornography. Respondents were also asked about their personal experiences with liking someone in a romantic way ('as more than just friends'), their current relationship status, and if they ever engaged in a series of different non-coital activities (spent time together without adults around; held hands; hugged/cuddled; kissed; flirted using media or sent sexual pictures of themselves; fondled/touched private parts). Questions did not assume heterosexual relations, but rather asked respondents to specify the sex (boy or girl) of the partner. In line with previous studies, experiences related to kissing, fondling, oral and vaginal sex were asked only if the respondent reported knowing about the specific activity or had engaged in any less intimate behaviors [14]. *Fondling* was defined as "touching someone's private parts, breasts or other parts of the body in a sexual way", *oral sex* as "mouth on genitals or private parts", and *vaginal sex* as "penis in vagina". A dichotomous variable was created to reflect engagement in any vs. no sexual behavior;

and a categorical variable assessed the number of different lifetime sexual behaviors. Survival analysis was used to assess the median age at the first experience for each reported behavior in order to account for the fact that not everyone had experienced all activities [25]. Respondents who reported that they had fondled, oral or vaginal sex were also asked about the circumstances of those activities (relationship to the partner, whether the activity was wanted, and the reasons for engaging in activities). Those who reported vaginal sex were also asked about contraceptive use and alcohol use at their first time.

Latent class indicators*:* Seven dichotomous indicator variables were selected for the latent class model: 1) *know what kissing is*, 2) *nnow what sexual intercourse is*, 3) *watched pornography)*, 4) *ever liked someone as more than friends and they liked you back*), 5) *spent time in private without adults around (with someone you liked as more than friends)*, 6) *held hands,* and 7) *hugged/cuddled.* The selection of indicators was driven by theory and past studies, by the recommendation to use fewer indicators with smaller sample sizes, and by the distribution of response patterns (excluding indicators with very low prevalence or high covariance with other indicators) [26]. The remaining variables were included to describe the range and circumstances of sexual experiences albeit their low prevalence.

Independent variables

A range of covariates were explored in line with the conceptual framework for this dissertation (Chapter 2) as well as past evidence on predictors of adolescent sexual initiation [5,13,27-31]. *Individual-level* factors included: age; biological sex; being born in the slum settlement; ethnic group, religious affiliation and religiosity (perceived importance of religion in life), and substance use (ever used alcohol or other drugs).

Pubertal development was self-assessed through questions about the onset of menstruation and breast growth for girls, and onset of genital growth, hair growth and/or voice change for boys. Respondents were also asked to evaluate their relative body change in relation to peers (about the same, faster, slower). At the *interpersonal level* three variables assessed household characteristics including household size; number of people sleeping in the same room; and relative household wealth, measured through an index based on household possession of 15 assets (e.g. electricity, indoor running water, car/truck, cell phone, TV) (Cronbach's alpha=0.64) and further categorized into wealth tertiles (ranging from the poorest to least poor thirds of the sample) [32,33]. Additional variables included family structure; whether parents live together; parental connectedness (perceived closeness to mother and father, respectively); and sibling age and sex. Variables at the *community level* consisted of school enrollment; current school grade, number of days missed at school during the past month; and educational aspirations (what level the respondent think he/she will complete). A categorical variable was used to assess grade for age (at expected grade or ahead, 1-2 grades behind, 3 or more grades behind). Finally, a 5-item scale assessed neighborhood social control, that is, the perceived likelihood of neighbors intervening in specific situations (e.g. if people were damaging property or engaging in illegal activities); categorized as low (25^{th} percentile), moderate (50^{th} percentile) and high (75^{th} percentile) (Cronbach's alpha=0.78)

Statistical analysis

Descriptive statistical analysis was conducted to identify the prevalence and distribution of all variables. Missing values ranged from 0.5% to 2% of observations for covariates and from 0.3% (spent time alone) to 2.7% (know what kissing is) for outcome variables

and were coded as 0. Weighted prevalence estimates of the outcomes variables were generated for the full sample, and stratified by sex. Statistical comparisons between boys and girls were not possible due to the low prevalence of romantic and sexual activities.

LCA was used to identify sub-groups of VYA based on their romantic and sexual experiences by fitting a series of models with increasing number of classes. Model selection was based on the comparison of fit statistics including Likelihood-ratio (X^2) and Chi-square (G^2) goodness of fit, Akaike's Information Criteria (AIC), Bayesian Information Criteria (BIC), sample size adjusted BIC (ssBIC), and the adjusted Lo-Mendel-Rubin likelihood-ratio test. The final model selection was also based on the quality of classification into classes and their interpretability [34]. Differential measurement for boys and girls was evaluated by separate regressions of each of the latent class indicators and class membership on biological sex [35].

The characteristics of the identified sub-groups were examined using latent class regression (LCR), in which the latent class model is estimated together with covariates in order to reduce measurement error [34]. Bivariate regressions were first conducted for each covariate, and the predicated probability of class membership was calculated by biological sex and age. This was followed by multivariate regression to estimate the adjusted odds ratio (aOR) and 95% confidence interval (CI) of being in a specific group compared to the reference. The selection of covariates for the adjusted model was based on bivariate significance, past research on adolescent sexual health, and colinearity. Modal class assignment shifted less than 5% in the adjusted model.

All analyses used survey weights to adjust for differences in selection probability and non-response. Descriptive analyses were conducted using Stata 12 [36] and the latent class modeling was done in Mplus 7 [37].

RESULTS

Sample characteristics

Table 4.1 presents the characteristics of the sample with mean age 12.4 years (50% boys). Most respondents (70.0%) were born in the slum settlement and the three largest ethnic groups were Kikuyu (33.1%), Luo (22.8%) and Luhya (16.5%). Religion was reported to be of high importance to nine in ten respondents; religions included: Catholic (27.5%), Protestant (27.0%), other Christian (22.9%) and Muslim (20.0%). Two-thirds of the sample (70.4% girls and 62.4% boys) indicated that they had started puberty, and 54.7% felt that their development was on track with peers. Very few (n=7) reported ever using alcohol or drugs. About half of respondents (51.9%) came from households with 5-7 people; one third (31.1%) reported sharing a sleeping room with 4 or more other people. While most respondents reported that both their biological parents were alive, 16.5% were single or double orphans (mainly paternal orphans). About three in four (78.2%) of those whose parents were alive reported that their parents live together. Most (74.7%) reported to feel very close to their mother; however, parental connectedness was lower in relation to fathers to whom 46.4% reporting feeling very close and one third (30.7%) were not close at all. Over half had at least one older brother (58.1%) or sister (62.4%). The majority (97.5%) was enrolled in school and of those, 49.5% were at their expected grade for age and 56.1% reported missing no school days during the past month; 17.9% had missed 3 or more days. Educational aspirations were high; almost three in four

(72.2%) aspired to complete college or university. About half (45.7%) indicated living in neighborhood with high social control whereas 26.8% reported low confidence in that their neighbors would help out in specific situations.

Prevalence and circumstances of romantic and sexual experiences

The prevalence of self-reported romantic and sexual experiences was relatively low, but varied by the type of activity (Table 4.2). Sixteen percent (19.2% boys, 13.4% girls) had liked someone in a romantic way, and for most the interest was mutual. Nine in ten respondents were not currently in a relationship. Taken together, one in six VYA reported some form of sexual experience. The most commonly reported non-coital activity was holding hands (13.2% boys, 7.9% girls), followed by hugging/cuddling (9.4% boys, 7.8% girls), spending time with someone alone (8.6% boys, 7.8% girls), kissing (4.3% boys, 1.0% girls), sexting (3.5% boys, 3.0% girls) and touching of private parts (3.4% boys, 1.5% girls). Five boys and three girls reported ever having had vaginal sex, and one boy and 2 girls that they had oral sex. Most reported heterosexual experiences; only one boy and two girls consistently reported that they engaged in romantic and non-coital activities with someone of the same sex. Awareness about sexual behaviors was much higher than actual behaviors; over two thirds of respondents knew about kissing and sexual intercourse, and at least 16% knew same-aged peers who engaged in these activities.

Among those who reported any sexual activity (n=59), most had experienced either one (n=21) or 2-3 (n=27) activities; 11 respondents reported engaging in 4 or more different sexual activities. The median age at initiation of the first activity among those with any such experience was 11 years (IQR 9–12) for boys and 12 years (IQR 8–14) for girls. Half of those who engaged in at least one behavior estimated that the first and last

activity occurred one or more years apart. VYA who reported to have fondled or had oral or vaginal sex were also asked about the circumstances of those activities. These data should be interpreted with caution given the small numbers. Out of those who reported to ever have fondled (n=9), most (5 of the 6) boys said that they were willing their first time while the opposite was true for girls (2 of the 3 said that they were not willing at all). For those that had vaginal sex (n=8), all 5 boys and 2 of the 3 girls indicated that they wanted this to happen, and for 2 of the 5 boys and 2 of the 3 girls the partner was a same-aged boy/girlfriend. Most boys indicated that their first sexual intercourse happened because they were in love or curious about sex (n=4), whereas for girls the most common reasons were threat/partner insistence (n=3) or promises of money or gifts (n=2).

Latent romantic and sexual experience sub-groups

The seven indicator variables yielded a total of 46 different response patterns (Appendix 4.8), indicating a large variability in romantic and sexual experiences. The most common pattern (40.9%) reflected awareness about sex but without any personal experience, and the second most common pattern reflected no awareness or personal experience (16.9%).

The results from the latent class analysis are shown in Table 4.3. Upon examination of solutions for one through four classes, a three-class model was selected based interpretability and fit statistics. While both the models with two and three classes had acceptable goodness of fit statistics and Entropy was higher for the 2-class model, the three-class model had better absolute model fit (G^2 and X^2 $p > 0.05$) and lower AIC, BIC and ssaBIC values (indicating better relative model fit). The four-class solution was excluded because the model did not converge (item response probabilities loaded consistently on 0 vs. 1) despite the use of multiple starting values. There was no

association between biological sex and each of the indicators, and the effect did not vary across classes, indicating that the same model could be used for both boys and girls.

In the selected three-class model, the first group (11.7%) was characterized by a high probability of awareness about sexual activities (0.88 kissing, 0.87 intercourse); having liked some and who liked them back (0.91); held hands (0.81); hugged/cuddled/kissed (0.64); spent time alone with a partner (0.57); and moderate probability of ever watching pornography (0.30). This group was consequently labeled *Involved*. Members of the second group (48.6%) was referred to as *Observant* given their high probability of awareness about sexual activities (0.98 kissing, 0.95 sexual intercourse) but low probability of personal experiences (ranging from 0.01 for hugging/cuddling/kissing to 0.02 for spending time alone) although slightly higher for watching pornography (0.12). In contrast, members of the third group (39.7%) distinguished themselves by moderate to low probability of sexual awareness (0.35 kissing, 0.27 sexual intercourse) and even lower in relation to personal experiences (ranging from 0.01 for holding hands to 0.06 for liking someone who also liked them back). This group was consequently labeled *Naïve.*

In order to show the distribution of romantic and sexual activities, respondents were assigned to their most likely class membership. As can be seen in Table 4.4, the Involved group more commonly reported being in a relationship (57.6%) compared to 2.0% of the Observant and 1.3% of the Naïve groups, and they were the only group that reported fondling (22.1%), vaginal sex (20.0%) or oral sex (7.3%), and/or to have engaged in four or more types of sexual activities (26.7%). The Involved group more commonly reported that they knew friends who kissed (69.6%) or had sexual intercourse

(50.1%), followed by the Observant group (28.0%, 16.8%), whereas fewer in Naïve group reported that their friends engaged in these activities (8.7%, 4.1%).

Characteristics of the identified romantic and sexual experiences sub-groups

Figure 4.1 shows the predicted probability of class membership, by age and sex. The probability of being in the Involved group was higher among older boys (5.4% 11-12 -year-olds vs. 23.9% among 13-14 -year-olds) and girls (5.9% among 11-12 -year-olds vs. 13.5% among 13-14 -year-olds). However, there were no significant differences between boys and girls for any of the age groups (*p* age*sex interaction >0.05).

In the adjusted LCR model, the odds of being in the Involved relative to the Naïve group increased with age (aOR = 3.12, 95% CI 2.0, 4.82) and was higher among those who had started puberty (aOR = 7.58, CI 1.8, 31.31), were single/double orphans (aOR = 4.2, 95% CI 1.42, 12.46), lived in households of greater relative wealth (aOR least poor tertile = 4.14, 95% CI 1.28, 13.41), and those perceiving a relatively fast pubertal development although the latter was only borderline significant (p<0.1) (Table 4.5). The same pattern in association was found when the Involved group was compared to the Observant group. In this comparison the Involved VYA also had lower odds of having missed 1-2 days compared to no days of school in the past month (aOR=0.32, 95% CI 0.11, 0.93). While Observant VYA were more likely to be older than the Naïve, there were no other sociodemographic differences that distinguished these two groups.

Class membership was not associated with sex, being born in Korogocho, household size, number of people sharing a sleeping space, sibling dyad, or neighborhood social control. While Involved VYA were *borderline* less likely than the Naïve of

aspiring to complete college/university in bivariate analyses (Appendix 4.9), this variable was not included in the adjusted model due to its colinerarity with missing school.

DISCUSSION

VYA in Nairobi slums are growing up in a context characterized by high social, physical and environmental risks, which carries adverse effects on their SRHR [20,38]. Indeed, studies based on retrospective reports by older adolescents indicate that the median age at first sexual intercourse is approximately three to five years lower in slum areas than non-slum areas [13]. Yet, this study indicates that while not all VYA in the study context are sexually 'inexperienced'—as further discussed below—most have not been involved in romantic and sexual activities. In addition, despite the high-risk environment of the Korogocho slum, VYA in this study reported many factors that have been found protective for early sexual debut [13,30]: most reporting being enrolled in school with high academic aspirations, feeling connected to their parents (although lower for fathers), and few had used alcohol or drugs. Early adolescence is thus a critical opportunity to enhance these positive assets, and provide boys and girls with the knowledge and skills needed to make informed and respectful decisions once they initiate sexual relations.

Given the young age of the adolescents in this study it is not surprising that very few reported having had vaginal sex (2.2%), and confirms the limited available data on VYA in Nairobi. In the longitudinal *Transitions into Adulthood* study, undertaken with 12-19 -year-olds in the Korogocho and Viwandani slums, 3% of 12-14 -year-old boys and girls reported that they had ever had sexual intercourse at baseline [22]. These low rates of sexual intercourse also parallel those found in different studies conducted with VYA in other sub-Saharan African countries, at 4% (Senegal, age 10-14, urban/rural)

[39], 7% (Ghana, age 12-14, urban) [40], 9% (Tanzania, age 10-14, rural) [41], and 10% (Zambia, age 10–14, urban) [42].

Nevertheless, one in eight girls and one in seven boys who would typically be classified as "sexually inexperienced" (based on self-reported vaginal sex) reported that they engaged in non-coital activities or liked someone in a romantic way. In addition, two thirds of all respondents indicated knowing what sexual intercourse is, and 16% knew friends who had sexual intercourse. There were over 40 different patterns of romantic and sexual experiences, a variation that would not have been captured by looking only at the prevalence of single or collapsed items. Using LCA, a typology of three underlying sub-groups was identified, with Involved VYA clearly distinguished from both the Observant and Naïve in terms of their greater romantic and sexual experiences and their background characteristics (age, pubertal development, family structure, relative wealth).

In particular, Involved VYA were more likely than the other two groups to have lost one or both parents, a finding that supports previous research highlighting orphanhood as a risk-factor for early sexual debut, particularly among girls [43-45]. The economic and social instability as well as psychosocial distress that often follow the loss of a parent may expose young people to greater sexual risk, for example, through less adult supervision and increased pressures to work [45]. It is also possible that orphaned adolescents have to turn to broader social networks such as their peers for support, which in turn may expose them to new (sexual) pressures [46]. VYA orphans thus represent an important target group in terms of SRHR programming, especially in Kenya where in 2012 an estimated 2.6 million children were orphaned with HIV/AIDS being a leading cause of parental death [47]. More research is needed, however, to better understand the

vulnerability and needs by type of orphan (e.g. single vs. double, maternal vs. paternal) as small numbers in the current study precluded such analyses.

The finding that the Involved group was more likely than the Naïve to report *greater* relative wealth is at first glance surprising given that most research has found a reverse relationship with the poorest being at highest risk of early sexual debut [17,48]. Nevertheless, a growing body of research derived primarily from the HIV/AIDS field has linked higher relative wealth to greater sexual risk-taking in sub-Saharan Africa [49-51]. Evidence suggests that this association may be partly explained by the highest wealth group – particularly men – being more likely than poorer peers to have multiple as well as causal sexual partners [50]. Greater access to resources may allow boys to negotiate sex through the exchange of money and gifts [50,52]. Indeed, in the current study two of the three girls who reported that they had vaginal sex and all who had fondled reported doing so because they were promised money or gifts. However, while exchanges of money and gifts usually flow from wealthier (older) males to poorer (younger) females [48], a sensitivity analysis indicated that *both* boys and girls of greater relative wealth in the current study were more likely to be in the Involved group. This finding indicates that exchange of money or gifts in this population may be not be driven solely by poverty, but rather reflect gendered sexual scripts guiding the negotiation of relationships between boys and girls of *similar ages*, and within the *same relative wealth groups*. Such scripts were highlighted in a qualitative study with 11-16 years olds in Nyanza, Kenya, where boys were usually the initiators of sexual relationships by offering girls money or gifts in exchange for "playing sex" [53]. Similarly, qualitative research from South Africa has shown that gift giving is a common and important part of sexual relationship formation

among same-aged adolescents [52]. Taken together, it may be that the least poor VYA in Nairobi slums are able to play out gendered sexual scripts at earlier ages due to their greater relative access to resources. These results support previous recommendations that poverty reduction programs alone are not sufficient to target the root causes of sexual risk taking in sub-Saharan Africa [49,50]. More research is needed to better understand the role of relative wealth in driving sexual initiation among young people in urban slums.

Latent class membership did not vary *significantly* by biological sex; and the same model could be applied to both boys and girls. While the lack of significance may be due to the small number of observations in the Involved group, it is unexpected given the wide range of studies showing that boys are more likely than girls to report sexual experiences. For example, in the four-country sub-Saharan African study referenced earlier 30% and 11% of boys in Malawi and Uganda reported that they had initiated sexual intercourse compared to 4% and 1% of girls [14]; and in a study of 12-15 -year-olds in Cape Town, South Africa boys were more likely than girls to report vaginal sex, anal and oral sex [54]. Given that sexual prowess is generally considered a key masculinity trait (while the same is stigmatized for girls) [55,56], boys may be more likely than girls to engage in early sexual relations, but also to *report* such activities in order to prove their manhood. The lack of significant sex differences in the current study signals that stereotypical gender norms related to sexuality have not (yet) materialized among boys in this specific setting; that is, they may not feel the need to start having sex, or to say that they have had sex. However, qualitative data collected as part of the GEAS indicate that cultural and social norms disapprove of and shame sexual relationships in

this age group *overall* [57], resulting in a low prevalence among both boys and girls. These relationships will be further explored in Chapter 5.

With the exception of age, there were no significant differences in the characteristics of the two largest groups in the current study – Observant vs. Naïve. The Observant group seem to represent a category of VYA who know what sex is, and are more likely than their Naïve peers to both have watched pornography and to know friends who are having sexual relations, but they themselves have not started to engage in partnered sexual relations. Observant VYA may thus be an especially important group to target with SRHR information and support, echoing the need for age (and developmentally) appropriate comprehensive sexuality education (CSE) that begins in early in childhood and gradually introduce information throughout adolescence in line with the evolving capacities and needs of boys and girls [58]. Given that primary education is compulsory in Kenya and most 10-14 -year-olds are in school [59], schools constitute one of the most effective arenas for reaching VYA with CSE. The provision of high-quality CSE in urban slums, however, is challenged by the controversies surrounding the appropriateness of CSE and the lack of training of teachers [60]. In addition, given that about one in four primary school students (about half in the current study) in Kenya are behind grade for age [61], some VYA may either be in a grade where CSE is not being taught, or they may be too old for the content delivered [62]. It is therefore essential that policymakers provide guidance and training so that teachers and other school professionals feel comfortable to deliver CSE and can tailor information according to the developmental readiness of VYA irrespective of their age or grade.

Limitations

The current study should be considered in the light of its limitations. First, the study relied on self-reported experiences; whether or not these reports represent the actual prevalence in the study setting is compromised by difficulties recalling the timing of behaviors, social desirability bias, and by variability in the understanding of what is being asked (e.g. what is meant by fondling?) [63]. However, the data collectors reported that almost all respondents irrespective of age or sex had a "very good" or "ok" understanding of all interview questions (96%) and that they responded truthfully (95%). Second, it is possible that measures related to sexual intentions could have helped to further refine the clustering of romantic and sexual behaviors in the current study given the evidence linking expectations to initiate sex to timing of sexual behaviors [30]. While we initially intended to assess sexual intentions, a skip pattern error precluded the use of such measures. Third, given that this is cross-sectional data temporality could not be determined. Finally, the relatively small sample and low prevalence of sexual activities furthered limited the use of other LCA indicators and to conduct stratified models. Despite its small size, the sample was representative and can thus be generalized to the population of 11-14 -year-olds in the study context.

To our knowledge this is the first study to apply LCA to explore patterns of early adolescent romantic and sexual experiences in urban poor sub-Saharan Africa. Taken together, the findings indicate that a dichotomous narrative based on self-reported vaginal sex is insufficient to characterize the emerging sexual experiences of VYA. Given the increasing interest to focus on early prevention approaches to improve adolescent SRHR, it is critical that efforts to monitor and evaluate such initiatives employ a wider range of measures that span not only own involvement in romantic and sexual activities, but also

sexual awareness, intentions, readiness and self-efficacy. In addition, more research is needed around the meaning of early romantic and sexual relationships, and how the formation and quality of relationships change over the course of adolescence.

CHAPTER 4 REFERENCES

1. Dixon-Mueller R. Starting young: Sexual initiation and HIV prevention in early adolescence. AIDS and Behavior. 2009;13: 100-109.

2. McCarthy K, Brady M, Hallman K. Investing when it counts: Reviewing the evidence and charting a course of research and action for very young adolescents. New York: Population Council. 2016.

3. WHO. The sexual and reproductive health of young adolescents in developing countries. Geneva, Switzerland: WHO; 2011.

4. Woog V, Kågesten A, Prada E (Forthcoming 2017) The sexual and reproductive health needs of very young adolescents (10–14) in developing countries: What does the evidence show? New York: Guttmacher Institute.

5. Dixon-Mueller R. How young is "too young"? Comparative perspectives on adolescent sexual, marital, and reproductive transitions. Studies in family planning. 2008;39: pp. 247-262.

6. Blum RW, Astone NM, Decker MR, Mouli VC. A conceptual framework for early adolescence: A platform for research. Int J Adolesc Med Health. 2014;26: 321-331.

7. Igras SM, Macieira M, Murphy E, Lundgren R. Investing in very young adolescents' sexual and reproductive health. Global public health. 2014: 1-15.

8. Whitaker DJ, Miller KS, Clark LF. Reconceptualizing adolescent sexual behavior: Beyond did they or didn't they? Fam Plann Perspect. 2000;32: 111-117.

9. de Graaf H, Vanwesenbeeck I, Meijer S, Woertman L, Meeus W. Sexual trajectories during adolescence: Relation to demographic characteristics and sexual risk. Arch Sex Behav. 2009;38: 276-282.

10. Haydon AA, Herring AH, Prinstein MJ, Halpern CT. Beyond age at first sex: Patterns of emerging sexual behavior in adolescence and young adulthood. Journal of Adolescent Health. 2012;50: 456-463.

11. Miller KS, Clark LF, Wendell DA, Levin ML, Gray-Ray P, Velez CN, et al. Adolescent heterosexual experience: A new typology. Journal of Adolescent Health. 1997;20: 179-186.

12. Upadhyay UD, Hindin MJ, Gultiano S. Before first sex: Gender differences in emotional relationships and physical behaviors among adolescents in the Philippines. Int Fam Plan Perspect. 2006;32: 110-119.

13. Kabiru CW, Beguy D, Undie CC, Zulu EM, Ezeh AC. Transition into first sex among adolescents in slum and non-slum communities in Nairobi, Kenya. Journal of Youth Studies. 2010;13: 453-471.

14. Bankole A, Biddlecom A, Guiella G, Singh S, Zulu E. Sexual behavior, knowledge and information sources of very young adolescents in four sub-Saharan African countries. Afr J Reprod Health. 2007;11: 28-43.

15. Hipwell AE, Keenan K, Loeber R, Battista D. Early predictors of sexually intimate behaviors in an urban sample of young girls. Developmental psychology. 2010;46: 366.

16. Butler TH, Miller KS, Holtgrave DR, Forehand R, Long N. Stages of sexual readiness and six-month stage progression among African American pre-teens. J Sex Res. 2006;43: 378-386.

17. Dodoo FN, Zulu EM, Ezeh AC. Urban-rural differences in the socioeconomic deprivation-sexual behavior link in Kenya. Soc Sci Med. 2007;64: 1019-1031.

18. Mberu B, Mumah J, Kabiru C, Brinton J. Bringing sexual and reproductive health in the urban contexts to the forefront of the development agenda: The case for prioritizing the urban poor. Matern Child Health J. 2014;18: 1572-1577.

19. Bronfenbrenner U. Ecological systems theory. Annals of Child Development. 1989;6: 187-249.

20. Emina J, Beguy D, Zulu EM, Ezeh AC, Muindi K, Elung'ata P, et al. Monitoring of health and demographic outcomes in poor urban settlements: Evidence from the Nairobi Urban Health and Demographic Surveillance System. Journal of Urban Health. 2011;88: 200-218.

21. Dobility Inc (2016) SurveyCTO [Technology for digital data collection]. Cambridge, MA.

22. Beguy D, Mumah J, Wawire S, Muindi K, Gottschalk L, Kabiru C. Status report on the sexual and reproductive health of adolescents living in urban slums in Kenya. STEP UP technical working paper. Nairobi: African Population and Health Research Center; 2013.

23. Hansen WB, Paskett ED, Carter LJ. The Adolescent Sexual Activity Index (ASAI): A standardized strategy for measuring interpersonal heterosexual behaviors among youth. Health Education Research. 1999;14: 485-490.

24. Hennessy M, Bleakley A, Fishbein M, Jordan A. Validating an index of adolescent sexual behavior using psychosocial theory and social trait correlates. AIDS and behavior. 2008;12: 321.

25. Zaba B, Pisani E, Slaymaker E, Boerma JT. Age at first sex: Understanding recent trends in African demographic surveys. Sexually Transmitted Infections. 2004;80: ii28-ii35.

26. German D, Latkin CA. Social stability and health: Exploring multidimensional social disadvantage. J Urban Health. 2012;89: 19-35.

27. Kenya National Bureau of Statistics, Ministry of Health Kenya, National Aids Control Council Kenya, Kenya Medical Research Institute, National Council for Population and Development, UNFPA Kenya Country Office. Kenya Demographic and Health Survey 2014. Rockville, MD, USA; 2015.

28. Kabiru CW, Orpinas P. Factors associated with sexual activity among high-school students in Nairobi, Kenya. Journal of adolescence. 2009;32: 1023-1039.

29. Marston M, Beguy D, Kabiru C, Cleland J. Predictors of sexual debut among young adolescents in Nairobi's informal settlements. Int Perspect Sex Reprod Health. 2013;39: 22-31.

30. Kirby D. Antecedents of adolescent initiation of sex, contraceptive use, and pregnancy. Am J Health Behav. 2002;26: 473-485.

31. Browning CR, Leventhal T, Brooks-Gunn J. Neighborhood context and racial differences in early adolescent sexual activity. Demography. 2004;41: 697-720.

32. Ndugwa RP, Kabiru CW, Cleland J, Beguy D, Egondi T, Zulu EM, et al. Adolescent problem behavior in Nairobi's informal settlements: Applying problem behavior theory in sub-Saharan Africa. J Urban Health. 2011;88 Suppl 2: S298-317.

33. Biney AAE, Dodoo FN-A. What are the characteristics of 'sexually ready' adolescents? Exploring the sexual readiness of youth in urban poor Accra. BMC Public Health. 2016;16: 1-11.

34. Collins LM, Lanza ST. Latent class and latent transition analysis: With applications in the social, behavioral, and health sciences. Hoboken, NJ: John Wiley & Sons;2010.

35. Muthén LK, Muthén BO (1998-2015) MPlus User's Guide. Seventh Edition. Los Angeles, CA: Muthén & Muthén.

36. StataCorp (2011) Stata Statistical Software: Release 12. College Station, TX: StataCorp LP.

37. Muthén BO, Muthén LK (1998-2015) MPlus. 7th ed.

38. Kabiru CW, Beguy D, Ndugwa RP, Zulu EM, Jessor R. "Making it": Understanding adolescent resilience in two informal settlements (slums) in Nairobi, Kenya. Child Youth Serv. 2012;33.

39. Diop N, Diagne A. Improving communication between parents and adolescents on reproductive health and HIVAIDS. Frontiers in Reproductive Health, Population Council; 2008. 54 p.

40. Glover EK, Bannerman A, Pence BW, Jones H, Miller R, Weiss E, et al. Sexual health experiences of adolescents in three Ghanaian towns. Int Fam Plan Perspect. 2003;29: 32-40.

41. Magnani RJ, Karim AM, Weiss LA, Bond KC, Lemba M, Morgan GT. Reproductive health risk and protective factors among youth in Lusaka, Zambia. J Adolesc Health. 2002;30: 76-86.

42. Exavery A, Lutambi AM, Mubyazi GM, Kweka K, Mbaruku G, Masanja H. Multiple sexual partners and condom use among 10-19 year-olds in four districts in Tanzania: What do we learn? BMC Public Health. 2011;11: 1-9.

43. Lee VC, Muriithi P, Gilbert-Nandra U, Kim AA, Schmitz ME, Odek J, et al. Orphans and vulnerable children in Kenya: Results from a nationally representative population-based survey. Journal of acquired immune deficiency syndromes (1999). 2014;66: S89-S97.

44. Chae S. Timing of orphanhood, early sexual debut, and early marriage in four sub-Saharan African countries. Studies in family planning. 2013;44: 123-146.

45. Palermo T, Peterman A. Are female orphans at risk for early marriage, early sexual debut, and teen pregnancy? Evidence from sub-Saharan Africa. Stud Fam Plann. 2009;40: 101-112.

46. Goldberg RE. Family instability and early initiation of sexual activity in western Kenya. Demography. 2013;50: 725-750.

47. UNICEF (2013) State of the world's children 2015 country statistical tables (2013 data). UNICEF.

48. Madise N, Zulu E, Ciera J. Is poverty a driver for risky sexual behaviour? Evidence from national surveys of adolescents in four African countries. Afr J Reprod Health. 2007;11: 83-98.

49. Mumah JN, Jackson-Smith D. Do the factors associated with female HIV infection vary by socioeconomic status in Cameroon? Journal of Biosocial Science. 2013;46: 431-448.

50. Mishra V, Assche SB, Greener R, Vaessen M, Hong R, Ghys PD, et al. HIV infection does not disproportionately affect the poorer in sub-Saharan Africa. Aids. 2007;21 Suppl 7: S17-28.

51. Awusabo-Asare K, Annim SK. Wealth status and risky sexual behaviour in Ghana and Kenya. Appl Health Econ Health Policy. 2008;6: 27-39.

52. Kaufman CE, Stavrou SE. 'Bus fare Ppease': The economics of sex and gifts among young people in urban South Africa. Culture, Health & Sexuality. 2004;6: 377-391.

53. Maticka-Tyndale E, Gallant M, Brouillard-Coyle C, Holland D, Metcalfe K, Wildish J, et al. The sexual scripts of Kenyan young people and HIV prevention. Culture, Health and Sexuality. 2005;7: 27-41.

54. Gevers A, Mathews C, Cupp P, Russell M, Jewkes R. Illegal yet developmentally normative: A descriptive analysis of young, urban adolescents' dating and sexual behaviour in Cape Town, South Africa. BMC Int Health Hum Rights. 2013;13: 31.

55. Marston C, King E. Factors that shape young people's sexual behaviour: A systematic review. Lancet. 2006;4: 1581-1586.

56. Varga CA. How gender roles influence sexual and reproductive health among South African adolescents. Stud Fam Plann. 2003;34: 160-172.

57. De Mayer S, Kågesten A, Mmari K, McEachran J, Chilet E, Kabiru C, et al. “Boys should have the courage to ask a girl out”: Gender norms in early adolescent romantic relationships. Journal of Adolescent Health. Forthcoming 2017.

58. UNESCO. Emerging evidence, lessons and practice in comprehensive sexuality education. A global review. Paris: UNESCO; 2015.

59. UNICEF. The State of the World’s Children 2016: A Fair Chance for Every Child. New York, NY: UNICEF; 2016.

60. Sidze E, Stillman M, Keogh S, Mulupi S, Egesa C, Leong E, et al. (Forthcoming 2017) From paper to practice: Sexuality education policies and their implementation in Kenya. New York: Guttmacher Institute and the African Population and Health Research Center.

61. UNESCO. Opportunities lost: The impact of grade repetition and early school leaving. Montreal, Quebec: UNESCO Institute for Statistics; 2012.

62. Haberland N, Rogow D. Sexuality education: Emerging trends in evidence and practice. J Adolesc Health. 2015;56: S15-21.

63. Brener ND, Billy JO, Grady WR. Assessment of factors affecting the validity of self-reported health-risk behavior among adolescents: evidence from the scientific literature. J Adolesc Health. 2003;33: 436-457.

Table 4.1 Overview of sample (N=365)

Variable	Category	n[a]	w %[a]
Age (mean=12.4; SE=1.1)	11–12 years	181	52.6
	13–14 years	184	47.4
Biological sex	Boy	181	50.0
	Girl	184	50.0
Born in the settlement		255	70.0
Ethnic group	Kikuyu	121	33.1
	Lou	83	22.8
	Luhya	60	16.5
	Borana	37	10.1
	Kamba	23	6.2
	Somali	20	5.4
	Other	21	5.9
Religion	No religion	9	2.6
	Catholic	101	27.5
	Protestant	98	27.0
	Other Christian	84	22.9
	Muslim	73	20.0
Religiosity	Low importance/no religion	38	10.5
	High importance	327	89.5
Started puberty, girls[c]	Period/larger breasts	132	70.4
Started puberty, boys[d]	Voice/beard/testicles	114	62.4
Started puberty, all		246	66.4
Body change relative to peers	About the same	200	54.7
	Faster	97	26.5
	Slower	68	18.8
Household size	1-4 people	103	28.6
	5-7 people	191	51.9
	≥ 8 people	71	19.6
Number of people sleeping in the same room	Alone or one more person	93	25.6
	2-3 other people	156	42.4
	≥ 4 other people	116	32.1
Relative wealth	1 (poorest)	124	33.9
	2 (middle poor)	124	34.0
	3 (least poor)	117	32.1
Family structure	Both parents alive	305	83.5
	Single/double orphan	60	16.5

Parents live together[b]	No	67	21.8
	Yes	238	78.2
Feel close to mother[b]	Not at all	37	11.9
	Somewhat	41	13.4
	A lot	227	74.7
Feel close to father[b]	Not at all	95	30.7
	Somewhat	70	22.9
	A lot	140	46.4
Brothers	No brother	44	12.2
	Younger brother(s)	108	29.7
	Older brother(s)	213	58.1
Sisters	No sister	50	14.1
	Younger sister(s)	85	23.5
	Older sister(s)	230	62.4
Enrolled in school	No	10	2.5
	Yes	355	97.5
School grade[e]	Primary Grade 1	1	0.3
	Primary Grade 2	10	3.1
	Primary Grade 3	23	6.8
	Primary Grade 4	45	13.2
	Primary Grade 5	70	20.3
	Primary Grade 6	75	21.3
	Primary Grade 7	63	17.1
	Primary Grade 8	51	13.5
	Secondary Form 1	14	3.7
	Secondary Form 2	3	0.7
Grade for age[e]	At expected grade or ahead	179	49.5
	1-2 grade behind	142	38.8
	≥3 grade behind	44	11.7
Days missed at school past month[e]	No days	198	56.1
	1–2 days	93	26.0
	≥3 days	64	17.9
Educational aspirations[e]	Complete primary/secondary	98	22.8
	Complete college/university	257	72.2
Substance use	Ever used alcohol/drugs	7	2.0
Neighborhood social control	Low (25th percentile)	98	26.8
	Moderate (50th percentile)	102	27.5
	High (75th percentile)	165	45.7

a) Unweighted observations (n), weighted percent (w%). Missing values (maximum n=9) were coded as 0.
b) Among those with both parents alive (N=305).
c) Denominator includes all girls (N=184).
d) Denominator includes all boys (N=181).
e) Among those enrolled in school (N=355).

Table 4.2 Prevalence of romantic and sexual experiences

		All (N=365)		Boys (N=181)		Girls (N=184)	
Variable	**Category**	**n** [a]	**w%** [a]	**n** [a]	**w%** [a]	**n** [a]	**w%** [a]
Liked someone as more than friends		63	16.4	37	19.2	26	13.4
Liked someone, person liked you back[b]		56	14.6	32	16.7	24	12.5
Current relationship status	Not in a relationship	332	91.5	164	91.4	168	91.7
	Boyfriend	12	3.1	–	–	12	6.3
	Girlfriend	18	4.6	15	7.7	3	1.5
	>1 partner	3	0.7	2	1.0	1	0.9
Know what kissing is[b]		264	71.9	133	72.6	131	71.3
Know what sexual intercourse is[b]		247	67.2	123	67.6	124	66.7
Know friends who kissed		93	25.0	46	24.6	47	25.4
Know friends who had sexual intercourse		58	15.7	27	14.7	31	16.6
Watched pornography[b]		37	10.1	21	11.3	16	8.8
Non-coital sexual behaviors	Spent time in private with partner[b]	31	8.2	16	8.6	15	7.8
	Held hands[b]	40	10.5	25	13.2	15	7.9
	Hugged/cuddled[b]	33	8.6	18	9.4	15	7.8
	Kissed[b]	10	2.7	8	4.3	2	1
	Sexted/online flirting	13	3.3	7	3.5	6	3
	Fondled/touched private parts	9	2.5	6	3.4	3	1.5
Coital sexual behaviors	Oral sex	3	0.8	1	0.6	2	1
	Vaginal sex	8	2.2	5	3.0	3	1.5
Any sexual behavior		59	15.4	33	17.4	26	13.5
Number of different sexual behaviors	1 type	21	36.1	11	34.2	10	38.5
	2–3 types	27	44.6	16	46.1	11	42.6
	≥ 4 types	11	19.4	6	19.7	5	18.9
Age at first sexual behavior	Median (IQR)	11 (9–12)		11 (9–12)		12 (8–14)	
Time between first and last behavior[c]	Same year	17	44.9	12	55.6	5	30.1

	≥ 1 year	19	50.2	9	40.4	10	63.8
	No data on age at behaviors	2	4.8	1	3.9	1	6
Willingness at initiation							
Fondled	Very/somewhat willing	6	67.1	5	82.4	1	36.6
	Not willing at all	3	32.9	1	17.6	2	67.4
Oral sex	Very/somewhat willing	1	31.5	–	–	1	50
	Not willing at all	2	68.5	1	100	1	50
Vaginal sex	Very/somewhat willing	7	88.5	5	100	2	66.3
	Not willing at all	1	11.5	–	–	1	33.7
Circumstances of 1st intercourse	Love/curiosity	5	64.3	4	80.7	1	32.6
Main reasons[d]	Peer pressure	2	27	2	41	–	–
	Partner pressure	3	44	2	51.5	1	32.6
	Threat/insistence	4	50	2	41	2	67.4
	Money/gifts	4	49.6	2	41	2	66.3
	Physically forced	2	25.0	1	20.5	1	33.7
Relationship to partner	Boy/girlfriend, same age	4	48.8	2	39.8	2	66.3
	Boy/girlfriend, older	1	12.7	1	19.3	–	–
	Other same-aged partner	2	25	1	20.5	1	33.7
	Mother/father	1	13.5	1	20.5	–	–
Contraceptive use	No	5	63.5	3	61.4	2	67.4
	Yes	3	36.5	2	38.6	1	32.6
Under influence of alcohol	No	7	86.5	4	79.5	3	100
	Yes	1	13.5	1	20.5	–	–

a) Unweighted observations (n/N), weighted percent (w%)
b) Indicator variable selected for LCA
c) Excluding those who reported only one behavior; two respondents did not indicate the age of their respective experiences.
d) Multiple response options possible; total exceed 100%.

Table 4.3 Latent class analysis of romantic and sexual experiences among boys and girls aged 11-14 (N=365).

	1-class model	**2-class model**		**3-class model***		
	Class 1	Class 1	Class 2	Class 1 "Involved"	Class 2 "Observant"	Class 3 "Naïve"
Latent class prevalence	1.0	0.154	0.846	0.12	0.486	0.397
Item response probability						
1. Know what kissing is	0.719	0.857	0.699	0.879	0.978	0.354
2. Know what sex (intercourse) is	0.672	0.84	0.647	0.871	0.951	0.271
3. Watched pornography	0.101	0.304	0.071	0.302	0.121	0.017
4. Liked someone as more than friends, they liked you back	0.146	0.877	0.038	0.907	0.018	0.064
5. Spent time alone (without adults)	0.082	0.533	0.015	0.567	0.023	0.011
6. Held hands	0.105	0.755	0.01	0.813	0.014	0.008
7. Hugged/cuddled/kissed	0.096	0.628	0.017	0.641	0.009	0.042
Model fit statistics						
Number of parameters (s)	7	15		23		
G^2 (Chi-square goodness of fit)	376.3 (<.001)	254.8 (<.001)		128.7 (.05)		
X^2 (Likelihood ratio)	404.7 (<.001)	67.3 (<.001)		79.4 (.96)		
-2 Log-likelihood	2121.1	1809.7		1724.9		
AIC	2135.1	1839.7		1771.0		
BIC	2162.4	1898.2		1860.6		
ssBIC	2140.2	1850.6		1787.7		
LMRT (k vs. k-1 classes)	–	<.001		<.001		
Entropy	–	.93		.77		

*Best LCA model given model fit statistics and conceptual considerations

Figure 4.1 Predicted probability of class membership, by age and sex

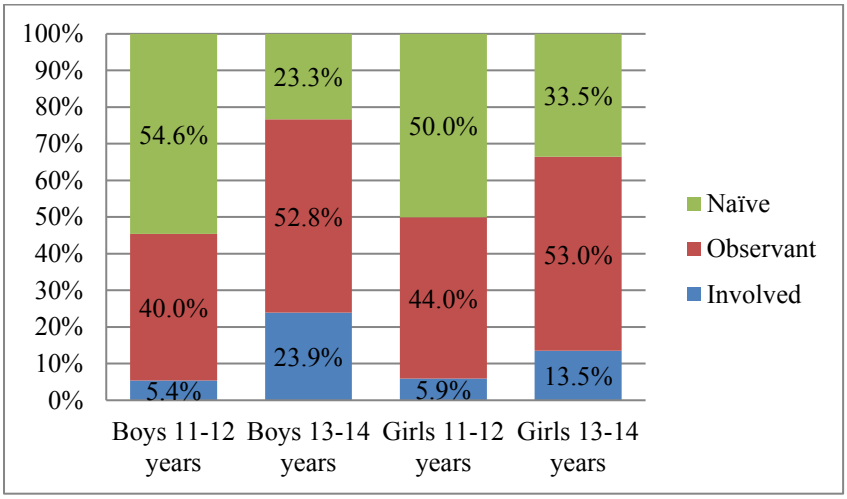


Table 4.4 Distribution of romantic and sexual experiences, by latent class (N=365)

	Class 1* Involved		**Class 2* Observant**		**Class 3* Naïve**	
	(N=43)		(N=184)		(N=138)	
	n	w%	n	w%	n	w%
Latent class indicators						
1. Know what kissing is	38	88.5	183	99.5	43	31.1
2. Know what sexual intercourse is	37	85.5	182	99	28	20.3
3. Watched pornography	12	28	24	13.2	1	0.8
4. Liked someone, they liked you back	40	92.2	7	0.4	9	0.6
5. Spent time alone (without adults)	25	59.1	4	2.2	2	0.1
6. Held hands	36	83.9	3	1.7	1	0.7
7. Hugged/cuddled/kissed	29	67.3	2	1.1	6	3.9
Other romantic and sexual experiences						
Know friends who kissed	30	69.6	52	28	11	8.1
Know friends who had sexual intercourse	21	50.1	31	16.8	6	4.2
Currently in a relationship	25	57.6	4	2	2	1.3
Fondled private parts	9	22.1	–	–	–	–
Oral sex	3	7.3	–	–	–	–
Vaginal sex	8	20	–	–	–	–
Nr of different sexual behaviors						
No sexual behaviors	–	–	176	95.6	130	94.9
1 type	7	16.2	8	4.5	6	3.9
2–3 types	25	57.1	–	–	2	1.2
4 or more types	11	26.7	–	–	–	–
Unwilling sexual experience	4	9.9	–	–	–	–

*Class membership was calculated using posterior probabilities, i.e. respondents were assigned to their most likely class based on the latent class model.

Table 4.5 Adjusted odds ratios of class membership (N=365).

	Involved vs. Naïve	**Observant vs. Naïve**	**Involved vs. Observant**
	aOR (95% CI)	aOR (95% CI)	aOR (95% CI)
Age (cont.)	3.12 (2.02, 4.82)***	1.43 (1.04, 1.98)***	2.22 (1.47, 3.36)***
Biological sex			
Boy	Ref	Ref	Ref
Girl	0.68 (0.28, 1.64)	1.05 (0.58, 1.92)	0.65 (0.28, 1.49)
Started puberty			
No	Ref	Ref	Ref
Yes	7.58 (1.83, 31.31)**	1.32 (0.35, 6.0)	5.75 (1.46, 22.62)*
Born in the settlement			
No	Ref	Ref	Ref
Yes	1.68 (0.61, 4.65)	0.84 (0.42, 1.67)	2.01 (0.8, 5.06)
Relative wealth			
1 (poorest)	Ref	Ref	Ref
2 (middle poor)	1.76 (0.61, 5.04)	0.99 (0.47, 2.07)	1.78 (0.65, 4.83)
3 (least poor)	4.14 (1.28, 13.41)**	1.52 (0.68, 3.41)	*2.72 (0.89, 8.3)* ±
Household size			
1-5 people	Ref	Ref	Ref
≥ 6 people	0.85 (0.39, 1.87)	0.63 (0.27, 1.48)	1.36 (0.58, 3.14)
Family structure			
Both parents alive	Ref	Ref	Ref
Single/double orphan	4.2 (1.42, 12.46)**	1.22 (0.51, 2.89)	3.45 (1.2, 9.91)*
Religiosity			
Low importance/no religion	Ref	Ref	Ref
High importance	0.35 (0.1, 1.18) ±	0.97 (0.49, 5.6)	1.78 (0.65, 4.83)
Body change relative to peers			
About the same	Ref	Ref	Ref
Faster	2.58 (0.98, 6.77) ±	0.85 (0.23, 3.07)	2.33 (0.99, 5.49) ±
Slower	0.85 (0.23, 3.07)	0.73 (0.32, 1.67)	1.16 (0.36, 3.74)
School days missed past month			
None	Ref	Ref	Ref
1–2	0.48 (0.14, 1.6)	1.48 (0.69, 3.18)	0.32 (0.11, 0.93)*
≥3	1.68 (0.51, 5.51)	1.93 (0.8, 4.64)	0.87 (0.29, 2.62)
Not enrolled in school	0.81 (0.09, 7.21)	1.54 (0.14, 16.81)	0.53 (0.1, 2.72)

***p<0.001, **p<0.01 *p<0.05, ± p<.01

Chapter 5 (Manuscript III) :

Are gender attitudes associated with romantic and sexual experiences in early adolescence? Findings from Nairobi, Kenya

ABSTRACT

Background: While the ages 10-14 years is a period of intensification in gender roles and perceptions, and a time when some young people initiate sexual activities, little is known about very young adolescents' (VYA) gender attitudes as related to romantic and sexual relationships. This study explored the degree to which urban poor VYA endorse dominant gender norms, their permissiveness towards early heterosexual relationships, and the association between such attitudes with romantic and sexual experiences.

Methods: A cross-sectional survey was conducted in an informal (slum) settlement in Nairobi (Kenya). The final analytical sample comprised 365 never-married 11-14-year-olds (84% response rate) of whom half were boys. Four scales measured agreement with gender norms related to male and female sexuality (female sexual risk, male sexual prowess, male sexual responsibility) and permissiveness towards early heterosexual relationships. Latent class analysis was used to assign respondents into three romantic and sexual experience sub-groups: 1) *Involved* (12%, high awareness of sex and some experience of romantic and sexual activities); 2) *Observant* (48%, high awareness but little own experience); and 3) *Naïve* (40%, little awareness or personal experience). Multivariate latent class regression models were conducted to examine the associations among gender and heterosexual relationship attitudes with romantic and sexual experience.

Results: Gender attitudes were fairly stereotypical, but varied across factors such as physical violence (among both boys and girls), adverse childhood experiences, peer norms, family structure and being born in the slum (among boys), and household size and wealth (among girls). Girls had higher endorsement of female sexual risk and male sexual prowess than did boys, while permissivness towards early sexual

relationships was low overall. The Involved group had higher endorsement of male sexual prowess and greater permissiveness towards early relations relative to the Naïve group. In the adjusted models, permissive relationship attitudes were the strongest predictor of greater romantic and sexual experiences.

Conclusion: While urban poor VYA in this context support stereotypic gender norms related to sexuality, such attitudes have not (yet) translated into behaviors as few girls and boys reported romantic and sexual relationships, and expressed low permissiveness towards doing so. Structures need to be in place that allow the most marginalized girls and boys to challenge gender stereotypes and cultivate equitable attitudes that promote healthy sexuality and sexual health.

INTRODUCTION

Addressing the sexual and reproductive health and rights (SRHR) challenges faced by adolescents in sub-Saharan Africa is critical. With 1.4 million adolescents aged 10-19 -year-olds living with HIV in the region as of 2016 [1], most new infections (90%) among young people aged 15-19 years are heterosexually transmitted [2] and 7 in 10 occur to young women [2]. In addition, pregnancy-related complications are among the leading causes of mortality and morbidity for women 15-19 years, who account for over half of all births in the region [3].

Growing up in urban informal settlements, or *slums* – a reality for many young people in sub-Saharan Africa – is a particular threat to adolescent SRHR [4-6]. Several studies in the region have demonstrated how adolescents in slums have earlier sexual debut [4,5,7,8], lower contraceptive use, and higher number of sexual partners [4,7,8] than their non-slum urban peers.

While multiple social and structural factors influence the timing and circumstances of sexual initiation in adolescence, gender – and especially harmful gender norms that perpetuate unequal power relations – are among the most important of these factors [9-11]. A global systematic review confirmed that norms related to the roles and power of men and women are central in shaping young people's sexual decision making [10]. These same gender norms also dictate the freedom, mobility and extent to which boys and girls are allowed to mingle [12,13]. In settings with very restrictive sexual norms, single standards prohibit early and premarital sexual relations for both boys and girls whereas in settings with more permissive sexual cultures the very same may be tolerated for both boys and girls [14]. However in most of sub-Saharan Africa, a gendered sexual double standard prevails that expects boys to display (hetero) sexual prowess as a means of gaining social status, whereas

premarital sex is considered inappropriate and a way for girls to loose respectability [11,15]. Such unequal expectations carry adverse SRHR consequences for both boys and girls, and are fueled by poverty [11,16-20].

Specifically, while global evidence shows that boys who endorsee stereotypical masculinity norms are more likely to have multiple and unprotected sexual relations, and perpetrate interpersonal violence [19,21-23], the harmful effect of such norms becomes even more pronounced in slums where qualitative research has demonstrated how young men use violence and multiple sexual partnerships as strategies to compensate for and defend their masculinity, as they are unable to realize the traditional patriarchal roles as 'breadwinners' [16,17,21,24]. For example, a study in Maputo, Mozambique found that many poor men as young as age 16 felt 'worthless' in the eyes of girlfriends due to their inability to provide them with gifts and financial support, and therefore relied on sexual prowess and violence as ways of demonstrating their male authority [16]. In contrast, girls who endorse stereotypical femininity norms may be less likely to initiate sex early based on the expectations that girls should 'protect' their virginity [25]. However, girl's endorsement of stereotypical gender norms may also constrain their ability to negotiate sex with (typically older) male partners, resulting in earlier and often coerced initiation [17,19,26,27]. Extreme poverty may further compel girls to engage in early sex to gain material and emotional support as well as trap them in abusive relations [27].

Clearly, there is a pressing need for early prevention that targets the precursors of early sexual risk taking in urban slums, including unequal gender attitudes. Early adolescence (ages 10-14) is increasingly seen as a window of opportunity as this is a period when attitudes form that in turn affect health behaviors [12,14,23,28]. Indeed, findings from the systematic review in Chapter 3 [29] indicate that very young

adolescent (VYA) boys and girls across the globe tend to endorse stereotypical gender attitudes related to sexuality. The results from the review, however, provided little insight into the attitudes of the most socioeconomically marginalized VYA as the preponderance of studies came from high-income settings.

The current study address this gap by exploring the degree to which VYA in residing in slum neighborhoods in Nairobi endorse dominant gender norms of female and male sexuality, their permissiveness towards early relationships, and the association between such attitudes with romantic and sexual activities. Indeed, evidence indicates that while most VYA in sub-Saharan Africa have not initiated sexual intercourse, some have begun to explore intimate relationships including having boy/girlfriends and non-coital activities (kissing, hugging, genital touching) [30]. In Chapter 4, I found that very few 11-14 -year-olds in Nairobi slums reported having had vaginal sex, yet three sub-groups could be distinguished ranging from those engaging in romantic and non-coital activities (*Involved*), to those with little own experience but high awareness of sexual activities (*Observant*), and those with little awareness or experience (*Naïve*).

Study aims and hypothesis

The study has three core objectives: 1) assess attitudes towards gender norms and early heterosexual relationships among 11-14 -year-olds in slum neighborhoods in Nairobi and describe the background, power-related and normative correlates of such attitudes; 2) examine the association between gender attitudes with romantic and sexual experiences; and 3) assess the potential mediating role of permissivness towards early heterosexual relationships on romantic and sexual experiences.

Based on systematic review findings (Chapter 3), I hypothesize that boys and girls will differ in their endorsement of gender attitudes, with boys being more likely

than girls to endorse stereotypical norms that perpetuate a sexual double standard (i.e. higher endorsement of both male sexual prowess and female sexual risk). I further hypothesize that gender attitudes will differ across romantic and sexual experience sub-groups in that Involved VYA will have more stereotypical attitudes relative to the other groups. Given the low prevalence of romantic and sexual activities, I expect that both boys and girls will have low permissiveness towards early heterosexual relationships. Consistent with other research [31,32], I also hypothesize that more permissive attitudes towards such relationships will be associated with higher likelihood of being in the Involved group, and that the inclusion of these attitudes in the model will mediate the effect of gender attitudes on class membership.

METHODS

Participants

Data were collected as part of the Global Early Adolescent study (GEAS), a 15-country study on early adolescent gender socialization and health in urban poor settings (www.geastudy.org). This paper uses data collected in the Kenyan study site, the Korogocho slum in Nairobi. A random sample of 630 never-married 10-14 -year-olds stratified by age and sex was selected from the Nairobi Urban Health and Demographic Surveillance Site (NUHDSS) [33]. Recruitment of 10-year-olds was however suspended about half way through the fieldwork due to the difficulties of these youngest respondents to understand the interview questions, and those already interviewed (n=58) were dropped from the current analysis. Of the 504 individuals aged 11-14-year-olds, 436 were eligible for interview (67 had moved out of the NUHDSS and one had died) and 366 respondents were interviewed (actual response rate 84%, 366/436). The main reasons for non-response were lack of consent or failure to reach the adolescent despite repeat attempt to locate them. Following the

exclusion of one respondent because of to poor data quality, the analytical sample comprised 365 11-14-year-olds (50% boys).

Procedure

Following informed parental consent and adolescent assent, data were collected through mobile computer-assisted personal interviewing. Trained local data collectors of the same sex as the adolescents interviewed the respondents using tablets programmed with a mobile technology platform called SurveyCTO [34]. All interviews took place at a local school and were conducted in Swahili or English. The data collection methods have been described in detail elsewhere (Chapter 2).
The Johns Hopkins Bloomberg School of Public Health Institutional Review Board, the WHO Ethical Review Board, and the African Medical and Research Foundation Ethics and Scientific Committee approved the study.

Measures

Dependent variable

The main outcome was a latent variable representing sub-groups of romantic and sexual experiences, based on responses to seven yes/no items spanning awareness about sex (*know what kissing is, know what sexual intercourse is, watched pornography*), romantic activities (*ever liked someone as more than friends and they liked you back*) and non-coital sexual activities (*ever spent time alone with someone as more than friends, held hands, hugged/cuddled/kissed*). Latent class analysis (LCA) was used to assign respondents to one of three classes.

1. *Involved* –high probability of being aware of sexual activities and moderate/high probability of involvement in different romantic and sexual activities[13].
2. *Observant* –high probability of being aware of sexual activities and some probability of having watched pornography, but low probability of involvement in romantic and activities.
3. *Naïve* – low/moderate probability of being aware of sexual activities and low probability of involvement in romantic and activities.

The development of the LCA model has been described elsewhere (Chapter 4).

Attitudes towards gender and early relationships

Four scales were used to assess attitudes towards gender and relationships: *female sexual risk*, *male sexual prowess*, *male sexual responsibility*, and *early heterosexual relationship* attitudes. The scales were developed through exploratory factor analysis of a broader universe of items related to VYA gender norms, described in detail elsewhere (Chapter 2). Each scale item was evaluated using 5-point Likert scale ranging from 1 (disagree a lot) to 5 (agree a lot); for purposes of the current analysis scores were reverse coded so that higher scores reflect higher agreement.

The *female sexual risk* scale comprised seven items reflecting norms related to girl's sexual vulnerability and the stigmatization of girls' bodies and sexuality. The ordinal alpha, a measure of scale reliability using polychoric correlations given the ordinal response options [35], was 0.73.

The *male sexual risk* scale consisted of six items reflecting normative views of boys as sexual "players" who cannot be trusted to have serious relations with girls (ordinal alpha=0.79).

[13] Coital sexual activities were not included as an indicator variable given their low prevalance; however, such activities were only reported by those classified as Involved.

Three items comprised the *male sexual responsibility* scale, reflecting attitudes related boy's responsibilities in sexual relations (ordinal alpha=0.76).

Finally, the *early heterosexual relationships* scale consisted of seven items across two sub-scales reflecting permissivness toward early adolescent boys and girls,being in intimate relationships. The current analysis used the full scale because the sub-scales scores (differentiating attitudes about boys versus girls) were quite similar (ordinal alpha=0.8).

Covariates

The selection of covariates was guided by the Theory of Gender and Power which highlights how personal attitudes are but one aspect of the structure of social norms, which in turn work together with power-related and background factors to directly or indirectly influence behaviors [36,37]. *Background* covariates included age group; started puberty (self-assessed), being born in the settlement; household size; religiosity (perceived importance of religion); family structure; whether parents live together; sibling age and gender; number of school days missed during the past month; number of close friends; media use, and relative wealth (categorized into poorest, middle poor and least poor tertiles based on an index reflecting the presence of 15 household assets). *Power-related covariates* comprised lifetime victimization of physical violence (ever hit, slapped or otherwise physically hurt a boy/girl) and perpetration of violence (ever hit, slapped or otherwise physically hurt by a boy/girl). Both variables were treated as categorical based on the sex of the perpetrator or victim (never, opposite or both sexes, same sex only). Adverse childhood experiences (ACEs) were measured through the exposure to 13 types of abuse and household dysfunctions organized into 7 categories (emotional abuse or neglect, sexual abuse, parental substance abuse, parental mental health issues, intimate partner violence in

the home, parental criminal behavior, and economic adversity). Positive responses to one or more of the questions in each category were summarized to create an ACE score ranging from 0 to 7 categories [38,39]. Finally, *normative covariates* included perceived peer romantic norms; whether some/all versus none/few close friends think having boy/girlfriends is important.

Statistical analysis

Descriptive statistics (means, standard deviations and weighted proportions) were calculated; missing values for scale were replaced with the mean of remaining items for respondents missing less than half of scale items. The non-parametric Mann-Whitney U and Kruskal-Wallis tests were used to compare the scale scores across covariates due to the skewedness of their distributions. Each scale was also dichotomized at the median based on the sex-specific range for boys and girls; differences in the proportion with high vs. low agreement were evaluated using Pearson's chi-square test. Binary logistic regression models were conducted by sex to evaluate the association between persmissivness towards early heterosexual relationships with gender attitudes.

LCR with Vermut's three-step correction for class uncertainty was used to model the association between latent class membership with gender and relationship attitudes [40,41]. The first step estimated the seven-indicator LCA model described earlier. In step two, individuals were assigned to their most likely class based on the model from step 1 and the uncertainty of this classification was estimated. In the third step, LCR was implemented using modal class membership as the latent outcome variable while incorporating the classification uncertainty rates from step 2. Bivariate regression of each attitudinal scale on class membership was first conducted. Next, background, normative and power-related covariates were added in blocks into a

series of models to estimate the adjusted odds ratio (aOR) and associated 95% confidence interval (CI) of membership in class *C* compared to the reference group. Bivariate significance, theory, and model fit statistics determined which covariates were included in the adjusted models. Interaction terms between sex with age and each attitudinal scale were also explored; none of the interaction terms were significant and were therefore excluded from the models. Stratified LCR models were conducted by sex; however due to the small numbers in each group these models generated very wide CIs and some parameters failed to converge.

All analyses were implemented in Stata 12 [42], except for the LCR models which were conducted in Mplus 7 [43]. The analyses used survey weights to adjust for the probability of selection and non-response by age and sex.

RESULTS

Correlates of gender and early relationship attitudes

The mean age of respondents was 12.4 years (50% boys). Most (97.5%) were enrolled in school at time of survey. Table 5.1 shows the mean gender and relationship attitude scales scores (ranging from 1–5), and the overall proportion that agreed with each scale item. Girls scored higher than boys both on the female sexual risk (4.1 *vs*. 3.8, p=0.02) and male sexual prowess scales (3.7 *vs.* 3.1 <0.001). There was also some indication that girls endorsed male sexual responsibility to a greater extent than boys, but this association was of borderline significance (p=0.06); agreement with this construct was high overall (4.2 among boys, 4.4 among girls). Overall, respondents reported low permissiveness towards early heterosexual relationships (1.9) with no difference by sex (p=0.73). Notably, only 15% of all respondents agreed that it is ok for boys and girls to be in a relationship as more than friends.

Gender attitudes differed significantly according to a range of characteristics as shown in Tables 5.2–5.3. Among boys, those born in the slum settlement were more likely to have high endorsement of male sexual prowess and male sexual responsibility compared to those born elsewhere; and boys who lived with a single parent had higher scores on the female sexual risk scale compared to those living with both parents. Perceiving permissive peer romantic norms was also positively associated with male sexual prowess among boys. For girls, on the other hand, living in a relatively smaller rather than larger household was positively associated with all gender attitude scales, and girls from the least poor households had higher agreement with male sexual prowess and female sexual risk relative to those with fewer household assets.

For both sexes, gender attitudes were associated with experiences of physical violence. Among boys, those who reported being a victim of violence from other boys (very few reported that a girl had hit or slapped them) or to have perpetrated violence against boys or girls had higher endorsement of male sexual prowess and male sexual responsibility as well as female sexual risk compared to those without such experiences. In addition, boys who reported three or more categories of ACEs were more likely than those with no such experiences to have high agreement with male sexual prowess. Among girls, high endorsement of male sexual prowess was more common among those who reported being victims of victimization from boys or other girls and among those who perpetrated violence against other girls (very few girls reported perpetrating violence against boys).

Both boys and girls who started puberty and perceived permissive peer romantic norms had more permissive attitudes towards early heterosexual relationships. Among girls but not boys, high permissive attitudes were also more

common among those who were victims of violence from boys or girls, perpetrated violence against girls, and experienced a greater number of different ACEs.

Overall, gender and relationship attitudes did not vary significantly by age, having older or younger siblings, number of school days missed in the past month, daily media use, number of close friends, or religiosity.

Associations between gender attitudes and early heterosexual relationship attitudes

Table 5.4 presents the results from the adjusted logistic regression of gender attitudes as potential predictors of early heterosexual relationship attitudes. Among boys, more permissive attitudes was positively associated with greater endorsement of male sexual prowess (aOR=1.93, CI 1.30–2.86), but negatively associated with female sexual risk (aOR=0.45, CI 0.26–0.79). More permissive attitudes towards early heterosexual relationships were also positively associated with permissive peer norms among boys (aOR=2.83, CI 1.14, 7.05). For girls, none of the gender scales were significantly associated with attitudes towards early heterosexual relationships; rather, the strongest potential predictors of the latter was pubertal onset (aOR=3.29, CI 1.36, 7.96), permissive peer romantic norms (aOR=2.70, CI 1.11, 6.58), violence perpetration against other girls (aOR=2.68, CI 1.01, 7.23), and a greater number of different ACEs (aOR=1.25, 1.01, 1.59).

Associations between gender and heterosexual relationship attitudes with romantic and sexual experiences

Figure 5.1 shows the latent romantic and sexual experience typology and the class-specific probabilities of each experience. Just under half of participants (48%) were classified as *Observant*, 39% were classified as *Naïve*, and 12% were classified as *Involved*. In bivariate analysis, gender and relationship attitudes differed by class

membership as shown in Table 5.5. The Involved group held more permissive attitudes towards early heterosexual relationships ($p<0.001$) and endorsed male sexual prowess ($p<0.05$) to a greater extent than the Naïve group; class membership was also borderline associated with male sexual responsibility ($p<0.1$). When stratified by sex the association with male sexual prowess was only borderline significant among boys and not significant among girls; and male sexual responsibility was a borderline significant correlate of latent class membership only among girls ($p<0.1$).

Results from the adjusted LCR models are shown in Tables 5.6–5.7. More permissive attitudes towards early heterosexual relationships remained strongly and positively associated with higher likelihood of being in the Involved group relative to the other groups; however, masculinity attitudes were no longer significant when all scales were added together. Given that male sexual prowess was positively associated with permissivness towards early relationships, this suggests that the latter might meditate the effect of masculinity attitudes on romantic and sexual experiences. Specifically, in Model 1, more permissive sexual relationship attitudes were associated with higher likelihood of being in the Involved group relative to both to the Naïve (aOR=2.95, CI 1.79, 4.88) and Observant (aOR=2.3, CI 1.47, 3.57) groups, but none of the gender attitude scales were significant. Although attenuated this association persisted after controlling for sociodemographics in Model 2, as well as when peer norms were included in Model 3. In the final model (Model 4) adding violence and ACEs, being in the Involved group (relative to the naïve group) remained associated with more permissive early relationship attitudes (aOR 2.64, CI 1.5, 4.62), older age (aOR=2.64, CI 1.5, 4.62), having started puberty (aOR=13.4, CI 5.8, 30.8), single/double orphanhood (aOR=4.61, CI 1.44, 14.78), perpetration of violence against the opposite or both sexes (aOR=14.0, CI 5.33, 36.68), and

borderline associated with lower religiosity (aOR=0.24, CI 0.05, 1.07). The same patterns of associations were found when comparing the Involved to the Observant as the reference. There were no significant differences when comparing the Observant and Naïve groups with the exception of older age being associated with the former group (aOR=2.82, 1.19, 6.7).

Results from the stratified models for boys and girls are shown in Appendix 5.1–5.2. Due to the instability of these models the results should be interpreted with caution. Overall, the results confirmed early heterosexual relationship attitudes rather than gender attitudes as a significant correlate of romantic and sexual experiences among both boys and girls.

DISCUSSION

Consistent with the systematic review in Chapter 3 – much of the literature for which came from high-income countries – the results of the present study show that endorsement of a gendered sexual double standard is fairly common among VYA in the study context. However, these attitudes do not appear to have translated into reported sexual behaviors. While endorsement of male sexual prowess was higher in the Involved group relative to those naïve, permissive attitudes towards early heterosexual relationships was a more powerful correlate of romantic and sexual experiences although most young adolescents expressed low acceptance of towards such relationships.

Nevertheless, even though few boys and girls were classified as Involved and most held unfavorable attitudes towards young adolescents being in romantic/sexual relationships, this will likely change over the course of adolescence. Indeed, pubertal onset was a strong correlate of both permissive attitudes towards early heterosexual relationships as well as involvement in activities; and the likelihood of the latter also

increased with age. And while there was no direct association between gender attitudes with romantic and sexual experiences, this too might change given that gender norms have been found a central determinant of sexual behaviors in older adolescent populations [9-11,16-20].

In particular, the results highlight the importance of challenging stereotypical masculinity norms, as endorsement of male sexual prowess among boys (but not girls) was linked with both permissive attitudes towards and involvement in romantic and sexual activities. High agreement with masculine sexual prowess was also closely linked with violence among boys, indicating that these are central ways of demonstrating masculinity already at young ages. Evidence indicates interventions that challenge stereotypic gender norms are more effective than programs that do not question (or merely acknowledge) gender norms to reduce sexual risk taking [44] and to prevent intimate partner violence as well as HIV/STI transmission [45]. However such gender norm change programs are relatively new and more impact evaluation is needed especially in the early adolescent age group [44,45].

Surprisingly, in the current study girls scored higher than boys on both the male sexual prowess and female sexual risk scales, indicating their greater endorsement of a sexual double standard. While this finding goes against what was hypothesized, it parallels the results from the 2015 Adolescent Girls Initiative Kenya baseline survey, where girls aged 11-14 years in the Kibera slum in Nairobi were more likely than their same-aged male peers to agree that “men rape girls because they cannot control themselves” (31% vs. 24%) and over a third agreed that it is “the girl’s duty to do whatever a man wants in marriage” [46]. One potential explanation in Nairobi slums for girls’ higher agreement with female sexual risk and male sexual prowess may be that they are more acutely aware of, as well as exposed to, gender

and power imbalance than are boys. Indeed, findings from the qualitative phase of the GEAS showed that as girls enter adolescence their mobility is increasingly restricted as parents perceive their daughters sexual development as problematic and consequently warn them about boys and risks related to their sexual and reproductive health [47].

However, while girls were more likely than boys to endorse stereotypical norms, such endorsement was not associated with permissive attitudes towards or involvement in romantic and sexual activities. While this is rather suspiring given the evidence linking girls' support of unequal gender attitudes to greater sexual risk [13,17,19,26,27], it may reflect the fact that very few girls were classified as Involved, thus limiting the ability to detect significant differences. It may also be that power-related factors are more central drivers of girls' sexual trajectories, given the strong association between violence and ACEs with early heterosexual relationship attitudes as well as romantic and sexual experiences. The latter finding reinforces what was concluded in Chapter 3, namely the importance of creating safety nets and support structures around girls to promote their agency and ability to challenge harmful gender stereotypes.

It is also important to reinforce that gender attitudes in early adolescence are complex and transient [13]. In the current study, many girls and boys had high agreement with male sexual *prowess* and but simultaneously reported an even higher agreement with male sexual *responsibility* (that boys should wait to have sex until they can support for their families and be careful not to get girls pregnant). Similar conflicting viewpoints on male sexuality were found in a qualitative study with 12-14-year-olds in South Africa. Focus groups with young adolescents revealed that while sexual activity was overall considered to be something that adults do and

should be postponed until marriage, male sexuality was simultaneously constructed as biologically determined, legitimizing and promoting early and multiple sexual partnerships among boys (but not girls) [48]. At the nexus of these two conflicting norms, responsibility appears to be undermined by the need for boys to prove masculinity through sexual prowess. This may help explain why male sexual responsibility was not associated with romantic and sexual experiences in the current study, although it may also be because this norm was so strong overall (i.e. there was little variability in the scores).

Limitations

This study has limitations that are important to mention. First, being cross-sectional precludes assessing the directionality of associations; for example, it may be that stereotypical gender attitudes and permissive relationship attitudes are consequences rather than predictors of romantic and sexual experiences. Secondly, the small sample size did not allow stratifying all models by sex and limited the power to detect significant differences. However, to the extent possible I attempted to fit separate models for boys and girls to verify trends in associations. Thirdly, all data were self-reported and it is possible that respondents underreported their romantic and sexual experiences. It is also possible that some VYA had trouble understanding questions related to gender norms and sexual relationships, although according to the data collectors most respondents understood and answered truthfully to all questions asked, with no differences by age or sex.

Nontheless, to our knowledge this is the first study to assess gender attitudes across a typology of romantic and sexual experiences among urban poor 11-14-year-olds in sub-Saharan Africa. Of the three identified romantic and sexual experience sub-groups, it is clear that the smallest group – those Involved – is particularly

important to target with SRHR information given that this group held more permissive attitudes toward early relations and more likely to report risk factors for early debut including violence and orphanhood. However, an equally important group to focus on would be the Observant group, who held fairly stereotypical attitudes and were clearly aware of – but had not yet engaged in – romantic and sexual activities. Indeed, it is because of the fact that most girls and boys had not yet formed intimate and sexual relationships (and their low permissiveness towards doing so) that makes the early adolescent period especially important for encouraging gender equitable views and behaviors. Furthermore, the results highlight that personal attitudes interacts with other domains of the Theory of Gender and power [36,37] such as violence to shape romantic and sexual experiences. Thus, for interventions to be successful in addressing harmful gender stereotypes among adolescents in urban poor settings, such programs need to move beyond a focus on individual attitudes to address the wider social and structural factors that affect gender norms as well as sexual behaviors. In particular, structures need to be in place that allow girls as well as boys to challenge gender stereotypes related to sexuality and that provide them with the support and information that they need to make informed decisions once they engage in sexual activities.

CHAPTER 5 REFERENCES

1. UNICEF. For every child, end AIDS – seventh stocktaking report. New York, NY: UNICEF; 2016.

2. UNAIDS. The Gap report. Geneva, Switzerland; 2014.

3. UNFPA. Motherhood in Childhood. Facing the challenge of adolescent pregnancy. State of World Population 2013. New York: UNFPA; 2013.

4. Dodoo FN, Zulu EM, Ezeh AC. Urban-rural differences in the socioeconomic deprivation-sexual behavior link in Kenya. Soc Sci Med. 2007;64: 1019-1031.

5. Kabiru CW, Beguy D, Undie CC, Zulu EM, Ezeh AC. Transition into first sex among adolescents in slum and non-slum communities in Nairobi, Kenya. Journal of Youth Studies. 2010;13: 453-471.

6. Mberu B, Mumah J, Kabiru C, Brinton J. Bringing sexual and reproductive health in the urban contexts to the forefront of the development agenda: The case for prioritizing the urban poor. Matern Child Health J. 2014;18: 1572-1577.

7. Greif MJ, Dodoo FN, Jayaraman A. Urbanisation, poverty and sexual behaviour: the tale of five African cities. Urban Stud. 2011;48: 947-957.

8. Zulu EM, Dodoo FN, Chika-Ezee A. Sexual risk-taking in the slums of Nairobi, Kenya, 1993-8. Popul Stud (Camb). 2002;56: 311-323.

9. Courtenay WH. Constructions of masculinity and their influence on men's well-being: A theory of gender and health. Social Science & Medicine. 2000;50: 1385-1401.

10. Marston C, King E. Factors that shape young people's sexual behaviour: A systematic review. Lancet. 2006;4: 1581-1586.

11. Varga CA. How gender roles influence sexual and reproductive health among South African adolescents. Stud Fam Plann. 2003;34: 160-172.

12. McCarthy K, Brady M, Hallman K. Investing when it counts: Reviewing the evidence and charting a course of research and action for very young adolescents. New York: Population Council. 2016.

13. International Center for Research on Women (ICRW). The girl effect: "What do boys have to do with It?'. Briefing note for an expert meeting and workshop, Washington, DC, 5-6 October. Washington, DC: ICRW; 2010.

14. WHO. The sexual and reproductive health of young adolescents in developing countries. Geneva, Switzerland: WHO; 2011.

15. Maticka-Tyndale E, Gallant M, Brouillard-Coyle C, Holland D, Metcalfe K, Wildish J, et al. The sexual scripts of Kenyan young people and HIV prevention. Culture, Health and Sexuality. 2005;7: 27-41.

16. Groes-Green C. Hegemonic and subordinated masculinities: Class, violence and sexual performance among young Mozambican men. Nordic Journal of African Studies. 2009;18: 286-304.

17. Izugbara C (2015) 'We are the real men': Masculinity, poverty, health, and community development in the slums of Nairobi, Kenya. Gothenburg, Sweden: University of Gothenburg.

18. Kerrigan D, Andrinopoulos K, Chung SE, Glass B, Ellen J. Gender ideologies, socioeconomic opportunities, and HIV/STI-related vulnerability among female, African-American adolescents. J Urban Health. 2008;85: 717-726.

19. MacPhail C, Campbell C. 'I think condoms are good but, aai, I hate those things': Condom use among adolescents and young people in a Southern African township. Soc Sci Med. 2001;52: 1613-1627.

20. Nzioka C. Perspectives of adolescent boys on the risks of unwanted pregnancy and sexually transmitted infections: Kenya. Reprod Health Matters. 2001;9: 108-117.

21. Barker G, Ricardo C. Young men and the construction of masculinity in Sub-Saharan Africa: Implications for HIV/AIDS, conflict, and violence. Washington, DC: World Bank; 2005.

22. Pleck JH, Sonenstein FL, Ku LC. Masculinity ideology: Its impact on adolescent males' heterosexual relationships. Journal of Social Issues. 1993;49: 11-29.

23. Greene M, Barker G. Masculinity and its public health implications for sexual and reproductive health and HIV prevention. Routledge handbook of global public health. 2011: 199-207.

24. Silberschmidt M. Disempowerment of men in rural and urban East Africa: Implications for male identity and sexual behavior. World Development. 2001;29: 657-671.

25. Foshee VA, Bauman KE. Gender stereotyping and adolescent sexual behavior: A test of temporal order. Journal of Applied Social Psychology. 1992;22: 1561-1579.

26. Jewkes R, Morrell R. Gender and sexuality: Emerging perspectives from the heterosexual epidemic in South Africa and implications for HIV risk and prevention. Journal of the International AIDS Society. 2010;13: 6.

27. Jewkes R, Morrell R. Sexuality and the limits of agency among South African teenage women: Theorising femininities and their connections to HIV risk practices. Soc Sci Med. 2012;74: 1729-1737.

28. Igras SM, Macieira M, Murphy E, Lundgren R. Investing in very young adolescents' sexual and reproductive health. Global public health. 2014: 1-15.

29. Kågesten A, Gibbs S, Blum RW, Moreau C, Chandra-Mouli V, Herbert A, et al. Understanding factors that shape gender attitudes in early adolescence globally: A mixed-methods systematic review. PLOS ONE. 2016;11: e0157805.

30. Woog V, Kågesten A, Prada E (Forthcoming 2017) The sexual and reproductive health needs of very young adolescents (10–14) in developing countries: What does the evidence show? New York: Guttmacher Institute.

31. Zuo X, Lou C, Gao E, Cheng Y, Niu H, Zabin LS. Gender differences in adolescent premarital sexual permissiveness in three Asian cities: Effects of gender-role attitudes. Journal of Adolescent Health. 2012;50: S18-S25.

32. Herbert L (2014) Sexual norms, gender role beliefs, condom attitudes and sexual behaviors among youth in Hanoi, Shanghai and Taipei. Baltimore, MD: Johns Hopkins University.

33. Emina J, Beguy D, Zulu EM, Ezeh AC, Muindi K, Elung'ata P, et al. Monitoring of health and demographic outcomes in poor urban settlements: Evidence from the Nairobi Urban Health and Demographic Surveillance System. Journal of Urban Health. 2011;88: 200-218.

34. Dobility Inc (2016) SurveyCTO [Technology for digital data collection]. Cambridge, MA.

35. Gadermann AM, Guhn M, Zumbo BD. Estimating ordinal reliability for Likert-type and ordinal item response data: A conceptual, empirical, and practical guide. Practical Assessment, Research & Evaluation. 2012;17: 1-13.

36. Connell R. Gender and power: Society, the person and sexual politics: John Wiley & Sons;1987.

37. Wingood GM, DiClemente RJ. Application of the Theory of Gender and Power to examine HIV-related exposures, risk factors, and effective interventions for women. Health Education & Behavior. 2000;27: 539-565.

38. Hillis SD, Anda RF, Felitti VJ, Marchbanks PA. Adverse childhood experiences and sexual risk behaviors in women: A retrospective cohort study. Fam Plann Perspect. 2001;33: 206-211.

39. Felitti VJ, Anda RF, Nordenberg D, Williamson DF, Spitz AM, Edwards V, et al. Relationship of childhood abuse and household dysfunction to many of the leading causes of death in adults. The Adverse Childhood Experiences (ACE) Study. Am J Prev Med. 1998;14: 245-258.

40. Asparouhov T, Muthén B. Auxiliary variables in mixture modeling: Three-step approaches using Mplus. Structural Equation Modeling. 2014;21: 329-341.

41. Vermunt JK. Latent class modeling with covariates: Two improved three-step approaches. Political Analysis. 2010;18: 450-469.

42. StataCorp (2011) Stata Statistical Software: Release 12. College Station, TX: StataCorp LP.

43. Muthén BO, Muthén LK (1998-2015) MPlus. 7th ed.

44. Barker G, Ricardo C, Nascimento M, Olukoya A, Santos C. Questioning gender norms with men to improve health outcomes: Evidence of impact. Glob Public Health. 2010;5: 539-553.

45. Dworkin SL, Treves-Kagan S, Lippman SA. Gender-transformative interventions to reduce HIV risks and violence with heterosexually-active men: A review of the global evidence. AIDS and Behavior. 2013;17: 2845-2863.

46. Austrian K, Muthengi E, Riley T, Mumah J, Kabiru C, Abuya B. Adolescent Girls Initiative-Kenya baseline report. Nairobi: Population Council; 2015.

47. Mmari K, Gibbs S, Moreau C, Michielsen K, Al-Attar G, El-Gibaly O, et al. 'Yea, I've grown; I can't go out anymore': Perceived risks for girls and boys entering adolescence. Culture, Health and Sexuality. Forthcoming 2017.

48. Ragnarsson A, Onya HE, Thorson A, Ekstrom AM, Aaro LE. Young males' gendered sexuality in the era of HIV and AIDS in Limpopo Province, South Africa. Qual Health Res. 2008;18: 739-746.

Table 5.1 Gender attitudes related to sexuality and relationships: scales scores for 11-14-year-old boys and girls.

Scale	**Total**		**Boys**	**Girls**	
	% agree[a]	Mean (SD)	Mean (SD)	Mean (SD)	*p**
Female sexual risk		3.9 [0.8]	3.8 [0.8]	4.1 [0.7]	0.02
Girls wear short dresses to get boys' attention	69.6				
Girls should be careful about the way they look so as not to seduce men	75.0				
Girls should avoid boys because they trick them into having sex	72.0				
If a girl says "no" to sex her boyfriend will dump her	55.9				
A girl might get a boyfriend because she wants money or gifts	68.8				
Girls often get into "trouble" when they have boyfriends	80.1				
Girls should protect their reputation above anything else	87.6				
Male sexual prowess		3.4 [0.5]	3.1 [1.0]	3.7 [1.0]	<0.001
Boys have girlfriends to show off to their friends	49.9				
Boys have girlfriends for fun more than love	48.2				
Boys generally compete for the prettiest girls	75.7				
Boys like girls who wear revealing clothes	52.7				
Boys lose interest in a girl after they have sex with her	50.8				
Boys fool girls into having sex	72.1				
Male sexual responsibility		4.3 [0.9]	4.2 [1.0]	4.4 [0.9]	0.06
Boys should not have sexual intercourse until they can provide for a family	81.6				
Boys should be careful not to get a girl pregnant	87.2				
A boy should take responsibility if he gets a girl pregnant	80.5				
Early heterosexual relationships		1.9 [0.8]	1.9 [0.8]	2.0 [0.8]	0.73
It's ok for a boy your age to talk and spend time with a girl alone	17.9				
It's ok for a boy your age to be in a relationship with a girl as more than friends	15.1				
It is ok for a boy to have more than one girlfriend at a time	10.2				
It is ok for a girl and boy your age to talk and spend time together alone	26.9				
It is ok for a girl your age to be in a relationship with a boy as more than friends	14.9				
It's normal for a girl to want a boyfriend at your age	18.2				
A girl can have a boyfriend as long as she continues working well in school	36.7				

a) Proportion responding "totally agree" or "agree" to each individual item.

***** Using the Mann Whitney *U*-test to assess differences in mean ranks. Higher scale scores indicate greater agreement.

Table 5.2 Gender and relationship attitude scale scores by background, power-related and normative characteristics: Boys (N=181)

Variable	Early heterosexual relations		Female sexual risk		Male sexual prowess		Male sexual responsibility	
	Mean (SD)[a]	High agree n (%)[b]	Mean (SD)[a]	High agree n (%)[b]	Mean (SD)[a]	High agree n (%)[b]	Mean (SD)[a]	High agree n (%)[b]
Age								
11 to 12	1.8 [0.8]	41 (45.5)	3.7 [0.9]±	39 (43.4)±	3.0 [1.0]	42 (46.9)	4.2 [1.0]	40 (44.4)
13 to 14	2.0 [0.9]	50 (54.4)	4.0 [0.8]	51 (55.4)	3.3 [1.0]	47 (51.6)	4.3 [1.0]	42 (46.5)
Started puberty								
No	1.8 [0.8]*	28 (40.9)*	3.7 [1.0]	30 (45.8)	3.1 [1.0]	35 (52.5)	4.2 [1.1]	31 (46.1)
Yes	2.0 [0.8]	63 (55.1)	3.9 [0.8]	60 (51.1)	3.2 [1.0]	54 (47.1)	4.2 [1.0]	51 (45.0)
Born in the settlement								
No	1.7 [0.7]	19 (41.2)	3.8 [0.8]	21 (46.7)	2.9 [1.1]*	17 (37.8)*	4.2 [0.9]	15 (32.9)*
Yes	2.0 [0.9]	72 (42.4)	3.9 [0.9]	69 (50.0)	3.2 [1.0]	72 (52.9)	4.2 [1.0]	67 (49.5)
Religiosity								
Low importance	2.0 [0.9]	13 (48.5)	3.7 [0.7]	11 (41.6)	3.2 [1.1]	14 (52.6)	4.3 [0.9]	9 (34.2)
High importance	1.9 [0.8]	78 (49.9)	3.9 [0.8]	79 (50.4)	3.1 [1.0]	75 (48.6)	4.2 [1.0]	73 (47.3)
Household size								
1-5 people	1.9 [0.7]	32 (46.7)	3.9 [0.8]	34 (50.3)	3.1 [1.0]	44.9 (30)	4.3 [1.0]	30 (45.7)
6 or more	2.0 [0.9]	59 (51.6)	3.8 [0.9]	56 (48.4)	3.2 [1.0]	59 (51.7)	4.2 [1.0]	52 (45.2)
Relative household wealth								
Poorest	2.0 [0.9]	29 (49.0)	3.9 [0.8]	29 (48.7)	3.2 [1.1]	34 (57.8)	4.1 [1.0]	22 (36.5)
Middle poor	1.9 [0.9]	29 (51.0)	3.8 [0.9]	27 (46.9)	3.0 [1.0]	25 (43.9)	4.2 [1.0]	25 (45.9)
Least poor	1.9 [0.8]	33 (49.3)	3.9 [0.9]	34 (51.3)	3.1 [1.0]	30 (45.7)	4.3 [1.0]	35 (52.9)
Family structure								
Both parents alive	1.9 [0.8]	76 (49.8)	3.8 [0.8]±	72 (46.8)±	3.1 [1.0]±	72 (47.3)	4.2 [1.0]	65 (43.0)
Single/double orphan	2.1 [1.1]	15 (49.3)	4.1 [0.8]	18 (61.2)	3.4 [0.9]	17 (58.7)	4.4 [0.8]	17 (58.1)

Parents live together								
No	2.0 [0.9]	13 (43.2)	4.1 [0.8]*	19 (62.3)±	3.2 [1.1]	17 (57.9)	4.1 [1.1]	12 (39.5)
Yes	1.9 [0.7]	63 (51.4)	3.7 [0.8]	53 (43.1)	3.1 [1.0]	55 (44.8)	4.2 [1.0]	53 (43.8)
Brothers								
None	2.1 [0.7]	15 (65.4)	4.0 [0.8]	12 (51.2)	2.9 [0.9]	11 (49.3)	4.3 [0.9]	10 (42.6)
Younger	1.8 [0.7]	18 (37.6)	4.0 [0.7]	29 (59.0)	3.0 [1.1]	21 (43.9)	4.3 [1.1]	27 (57.0)
Older	2.0 [0.9]	58 (51.8)	3.7 [0.9]	49 (44.3)	3.2 [1.0]	57 (51.4)	4.2 [0.9]	45 (40.8)
Sisters								
None	2.3 [0.8]±	16 (67.0)	3.7 [1.0]	12 (50.7)	2.9 [1.0]	10 (42.0)	4.3 [1.0]	12 (49.9)
Younger	1.7 [0.7]	16 (39.2)	3.9 [0.8]	21 (40.9)	3.1 [1.0]	17 (41.7)	4.1 [1.1]	18 (44.4)
Older	1.9 [0.9]	59 (49.9)	3.9 [0.8]	57 (48.5)	3.2 [1.0]	62 (53.4)	4.2 [1.0]	52 (44.8)
School days missed past mo.								
None	1.9 [0.8]	44 (49.3)	3.8 [0.9]	45 (50.3)	3.2 [1.0]	47 (52.7)	4.2 [1.0]	38 (43.7)
1–2	1.9 [0.8]	29 (51.8)	3.9 [0.8]	26 (46.1)	3.0 [1.1]	23 (41.8)	4.1 [1.1]	23 (40.5)
≥3	2.1 [0.9]	16 (50.8)	3.9 [0.8]	16 (50.8)	3.3 [0.9]	17 (54.1)	4.4 [0.8]	19 (61.6)
Not in school	1.9 [1.2]	2 (30.1)	4.0 [0.8]	3 (50.0)	3.0 [1.2]	2 (34.9)	4.4 [0.6]	2 (30.1)
Media use (daily)								
Do not use media	1.8 [0.7]	19 (43.9)	3.9 [0.8]	23 (51.5)	3.1 [1.1]	23 (51.5)	4.2 [1.0]	20 (44.4)
1-2 hour	2.0 [0.9]	56 (52.7)	3.9 [0.8]	50 (48.3)	3.2 [1.0]	50 (48.3)	4.2 [1.0]	48 (47.0)
3 or more hours	2.0 [0.8]	16 (48.7)	3.6 [1.0]	16 (48.3)	3.1 [0.9]	16 (48.3)	4.1 [1.1]	14 (41.8)
Nr close friends								
0-1	1.9 [0.9]	7 (44.4)	3.6 [0.8]	5 (30.7)	3.2 [1.1]	9 (56.2)	4.0 [1.2]	6 (37.2)
2–3	1.9 [0.8]	29 (53.9)	3.8 [0.7]	24 (44.1)	3.0 [1.0]	22 (42.0)	4.0 [1.1]	20 (37.9)
3 or more	1.9 [0.8]	44 (48.6)	3.9 [0.9]	61 (54.0)	3.2 [1.0]	58 (51.4)	4.3 [0.9]	56 (50.0)
Close friends think having boy/girlfriends is important								
Few/none	1.8 [0.8]**	62 (43.6)**	3.8 [0.8]	68 (47.8)	3.0 [1.1]**	63 (44.8)*	4.2 [1.0]	64 (45.1)

Some/all	2.4 [0.8]	29 (72.3)	3.9 [0.9]	22 (53.9)	3.5 [0.8]	26 (65.0)	4.3 [1.1]	18 (46.4)
Violence victimization								
Never	1.9 [0.8]	67 (49.3)	3.8 [0.9]*	62 (45.7)	3.0 [1.1]*	62 (45.6)*	4.2 [1.0]	55 (40.5)*
Only same sex	2.0 [0.9]	21 (51.3)	4.1 [0.7]	25 (60.3)	3.5 [0.7]	26 (65.8)	4.4 [0.9]	24 (61.3)
Opposite/both sexes	2.5 [1.0]	3 (48.2)	3.5 [0.8]	3 (52.9)	3.0 [0.6]	1 (19.3)	4.2 [0.9]	3 (52.0)
Violence perpetration								
Never	1.9 [0.8]	70 (51.9)	3.7 [0.9]*	58 (42.7)*	3.0 [1.1]*	58 (43.1)*	4.1 [1.0]*	52 (39.0)*
Only same sex	1.9 [0.8]	11 (41.3)	4.3 [0.6]	18 (68.2)	3.3 [0.8]	15 (58.3)	4.5 [0.8]	17 (64.6)
Opposite/both sexes	1.9 [0.9]	10 (46.3)	4.1 [0.7]	14 (65.3)	3.6 [0.8]	16 (75.1)	4.5 [0.9]	13 (61.4)
ACES (nr of categories)								
0	1.8 [0.8]	8 (39.9)	3.9 [0.9]	11 (54.1)	3.2 [1.1]**	11 (55.2)**	4.2 [1.1]	11 (53.6)
1	1.9 [0.8]	26 (48.6)	3.6 [0.9]	21 (39.3)	2.8 [1.0]	17 (31.6)	4.2 [1.1]	23 (42.3)
2	1.8 [0.7]	23 (43.0)	3.9 [0.8]	27 (51.2)	3.2 [1.0]	24 (46.6)	4.3 [0.9]	25 (49.0)
3 or more	2.1 [0.9]	34 (61.0)	3.9 [0.8]	31 (55.0)	3.5 [1.0]	37 (66.9)	4.2 [1.0]	23 (42.0)

***p<0.001, ** p<0.01, *p<0.05, ±p<0.1.

a) The Mann Whitney *U*-test was used to assess differences in mean ranks between two groups, and the Kruskal-Wallis test for two or more groups.

b) Pearson's chi-square test was used compare differences in high (median or above) vs. low agreement, for each covariate category. Weighted row percent are displayed.

Table 5.3 Gender and relationship attitude scale scores by background, power-related and normative characteristics: Girls (N=184)

Variable	Early heterosexual relations		Female sexual risk		Male sexual prowess		Male sexual responsibility	
	Mean (SD)[a]	High agree n (%)[b]	Mean (SD)[a]	High agree n (%)[b]	Mean (SD)[a]	High agree n (%)[b]	Mean (SD)[a]	High agree n (%)[b]
Age								
11 to 12	1.9 [0.7]	41 (45.0)	4.1 [0.7]	45 (49.3)	3.6 [0.9]	42 (46.2)	4.4 [0.8]	50 (54.7)
13 to 14	2.0 [0.9]	46 (49.5)	4.1 [0.8]	47 (50.5)	3.7 [1.0]	50 (53.8)	4.4 [0.9]	50 (53.7)
Started puberty								
No	1.7 [0.7]*	15 (29.1)*	4.1 [0.7]	25 (47.6)	3.5 [1.0]±	22 (42.5)	4.4 [0.9]	29 (55.1)
Yes	2.1 [0.8]	72 (54.7)	4.1 [0.7]	67 (50.8)	3.8 [1.0]	70 (52.9)	4.4 [0.9]	71 (53.9)
Born in the settlement								
No	2.0 [0.7]	32 (49.0)	4.0 [0.7]	27 (42.05)	3.6 [1.0]	31 (47.7)	4.4 [1.0]	36 (56.2)
Yes	1.9 [0.8]	55 (46.1)	4.1 [0.8]	65 (54.1)	3.7 [1.0]	61 (51.0)	4.4 [0.8]	64 (53.2)
Religiosity								
Low importance	2.0 [0.9]	4 (32.9)	4.0 [0.6]	6 (40.0)	3.5 [1.0]	5 (40.3)	4.4 [0.8]	5 (41.8)
High importance	2.0 [0.8]	83 (48.1)	4.1 [0.7]	87 (50.6)	3.7 [1.0]	87 (50.0)	4.4 [0.9]	95 (55.1)
Household size								
1-5 people	2.0 [0.8]	52 (51.2)	4.2 [0.6]**	57 (56.5)*	3.8 [1.0]*	59 (58.1)*	4.6 [0.7]**	62 (61.9)*
6 or more	1.9 [0.8]	35 (41.2)	3.9 [0.8]	35 (41.7)	3.5 [0.9]	33 (39.6)	4.2 [1.0]	38 (44.8)
Relative household wealth								
Poorest	1.9 [0.8]	26 (39.4)	4.1 [0.7]*	33 (50.2)*	3.6 [1.0]*	32 (48.7)	4.3 [0.9]	31 (47.0)
Middle poor	2.0 [0.8]	37 (53.6)	3.9 [0.7]	26 (38.4)	3.4 [0.9]	29 (41.6)	4.5 [0.8]	40 (59.1)
Least poor	2.0 [0.8]	24 (48.0)	4.3 [0.8]	33 (65.0)	3.9 [1.0]	32 (62.4)	4.4 [0.8]	29 (56.8)
Family structure								
Both parents alive	2.0 [0.8]	72 (47.1)	4.1 [0.7]	80 (52.1)	3.7 [1.0]	78 (50.8)	4.5 [0.8]*	88 (57.3)±
Single/double orphan	2.0 [0.7]	15 (47.2)	4.0 [0.6]	12 (38.7)	3.7 [0.8]	14 (45.0)	4.2 [0.9]	12 (39.3)

Parents live together								
No	2.1 [0.8]	21 (57.5)	4.1 [0.9]	21 (56.4)	3.6 [1.1]	18 (49.2)	4.4 [0.8]	19 (52.4)
Yes	1.9 [0.8]	51 (43.8)	4.1 [0.7]	59 (50.8)	3.7 [0.9]	60 (51.3)	4.5 [0.8]	69 (58.9)
Brothers								
None	2.1 [1.0]	9 (42.2)	3.9 [0.8]±	9 (42.2)±	3.9 [0.7]	14 (60.7)	4.5 [0.8]	11 (52.2)
Younger	1.9 [0.8]	23 (38.3)	4.2 [0.6]	37 (61.7)	3.8 [0.9]	34 (56.4)	4.5 [0.7]	33 (54.8)
Older	2.0 [0.7]	55 (53.3)	4.0 [0.7]	46 (44.6)	3.6 [1.0]	45 (42.7)	4.3 [1.0]	56 (54.3)
Sisters								
None	1.8 [0.8]	10 (38.6)	4.2 [0.7]	14 (52.9)	3.7 [1.0]	14 (52.2)	4.7 [0.5]	17 (65.5)±
Younger	2.0 [0.9]	22 (50.5)	4.2 [0.7]	26 (59.0)	3.7 [1.0]	22 (49.8)	4.5 [0.8]	29 (65.7)
Older	2.0 [0.8]	55 (47.9)	4.0 [0.7]	52 (45.7)	3.7 [1.0]	56 (49.2)	4.3 [0.9]	54 (47.2)
School days missed past mo.								
None	1.9 [0.8]	49 (44.8)	4.0 [0.8]	48 (43.9)	3.7 [1.0]	54 (49.4)	4.4 [0.9]	59 (54.6)
1–2	2.0 [0.8]	20 (52.4)	4.2 [0.7]	21 (55.7)	3.9 [0.9]	22 (58.0)	4.5 [0.6]	21 (54.1)
≥3	2.0 [0.9]	17 (51.3)	4.2 [0.6]	20 (60.2)	3.5 [1.1]	14 (41.7)	4.4 [0.8]	18 (53.9)
Not in school	1.5 [0.3]	1 (23.8)	4.2 [0.2]		3.8 [0.7]	2 (50.4)	4.2 [1.2]	2 (49.6)
Media use (daily)								
Do not use media	1.9 [0.8]	19 (47.3)	4.0 [0.8]	19 (46.7)	3.5 [1.1]	19 (46.7)	4.4 [0.8]	21 (51.7)
1-2 hour	1.9 [0.8]	41 (43.5)	4.1 [0.7]	49 (52.0)	3.7 [0.9]	45 (47.8)	4.4 [0.8]	52 (55.0)
3 or more hours	2.0 [0.8]	27 (54.0)	4.1 [0.7]	24 (48.3)	3.7 [1.0]	28 (56.1)	4.3 [1.0]	27 (54.8)
Nr close friends								
0-1	1.7 [0.6]	6 (37.0)	4.1 [0.7]	8 (47.6)	3.6 [1.1]	8 (47.6)	4.5 [0.7]	9 (53.6)
2–3	2.0 [0.8]	32 (53.4)	4.0 [0.7]	27 (45.3)	3.7 [0.9]	28 (47.4)	4.3 [1.0]	27 (45.3)
3 or more	2.0 [0.8]	49 (45.2)	4.1 [0.7]	57 (52.7)	3.7 [1.0]	56 (51.5)	4.5 [0.8]	64 (59.3)
Close friends think having boy/girlfriends is important								
Few/none	1.9 [0.8]**	60 (42.9)*	4.1 [0.7]	74 (52.8)	3.7 [1.0]	73 (52.1)	4.5 [0.8]±	80 (57.1)

Some/all	2.3 [0.8]	27 (60.6)	3.9 [0.8]	18 (40.7)	3.7 [1.0]	19 (42.7)	4.2 [1.0]	20 (45.1)
Violence victimization								
Never	1.9 [0.8]*	61 (45.2)*	4.1 [0.7]	67 (49.5)	3.6 [1.0]*	66 (48.8)*	4.4 [0.9]	75 (55.4)
Only same sex	2.2 [0.7]	7 (36.1)	4.0 [0.7]	13 (43.5)	3.8 [0.9]	14 (46.2)	4.4 [4.4]	17 (56.1)
Opposite/both sexes	2.1 [1.0]	19 (62.9)	4.1 [0.7]	12 (62.2)	4.0 [0.6]	12 (62.8)	4.5 [4.5]	8 (43.0)
Violence perpetration								
Never	1.9 [0.8]*	56 (42.0)*	4.0 [0.7]	64 (47.8)	3.6 [1.0]*	59 (44.1)*	4.4 [0.9]	72 (53.9)
Only same sex	2.2 [0.8]	7 (53.5)	4.2 [0.7]	21 (56.1)	4.1 [0.9]	27 (71.6)	4.4 [0.9]	22 (58.0)
Opposite/both sexes	1.9 [0.6]	24 (63.5)	4.0 [0.8]	7 (53.7)	3.7 [0.7]	6 (46.7)	4.4 [0.8]	6 (47.7)
ACES (nr of categories)								
0	1.7 [0.8]**	6 (30.6)*	4.1 [0.9]	11 (55.6)	3.7 [1.0]	13 (65.1)	4.6 [0.6]	13 (65.3)
1	1.7 [0.7]	15 (33.7)	4.0 [0.7]	21 (44.1)	3.6 [1.0]	23 (47.9)	4.3 [1.1]	26 (55.0)
2	1.9 [0.7]	27 (49.2)	4.2 [0.7]	31 (57.2)	3.8 [1.0]	29 (54.0)	4.4 [0.7]	28 (51.3)
3 or more	2.3 [0.8]	38 (61.2)	4.0 [0.7]	29 (46.1)	3.6 [0.9]	27 (42.7)	4.4 [0.8]	33 (52.7)

***p<0.001, ** p<0.01, *p<0.05, ±p<0.1.

a) The Mann Whitney *U*-test was used to assess differences in mean ranks between two groups, and the Kruskal-Wallis test for two or more groups.

c) Pearson's chi-square test was used compare differences in high (median or above) vs. low agreement, for each covariate category. Weighted row percent are displayed.

Table 5.4 Predictors of permissive attitudes towards early heterosexual relationships (high vs. low agreement) among urban poor 11-14-year-olds in Nairobi

	Boys (N=181)		Girls (N=184)	
Variable	aOR	95% CI	aOR	95% CI
Female sexual risk (cont.)	0.45**	0.26, 0.79	0.97	0.58, 1.64
Male sexual prowess (cont.)	1.93**	1.30, 2.86	0.74	0.47, 1.19
Male sexual responsibility (cont.)	0.77	0.53, 1.12	0.86	0.56, 1.31
Age 13-14 years (vs.: 11-12 years)	1.28	0.65, 2.50	0.71	0.35, 1.45
Started puberty (vs. no)	1.75	0.87, 3.51	3.29**	1.36, 7.96
Born in the settlement (vs. no)	1.29	0.58, 2.88	1.07	0.51, 2.23
Single/double orphan (vs.: both parents alive)	1.10	0.30, 4.00	0.68	0.23, 2.08
Parents live together (vs. no)	1.32	0.49, 3.55	0.75	0.33, 1.74
Household size ≥6 people (vs. 1-5 people)	0.97	0.47, 1.98	0.70	0.35, 1.42
Most friends think having boy/girlfriends is important (vs. none/few)	2.83*	1.14, 7.05	2.70*	1.11, 6.58
Violence perpetration, opposite/both sex (vs. never)	0.62	0.19, 2.04	1.54	0.44, 5.40
Violence perpetration, only same sex (vs. never)	0.62	0.21, 1.90	2.68*	1.01, 7.23
ACEs categories (cont.)	1.11	0.87, 1.43	1.25*	1.01, 1.59

*** p<0.001, ** p<0.01, * p<0.05

Figure 5.1 Three latent classes of romantic/sexual experience among urban poor 11-14-year-olds in Nairobi, Kenya: class-specific probabilities of indicator response

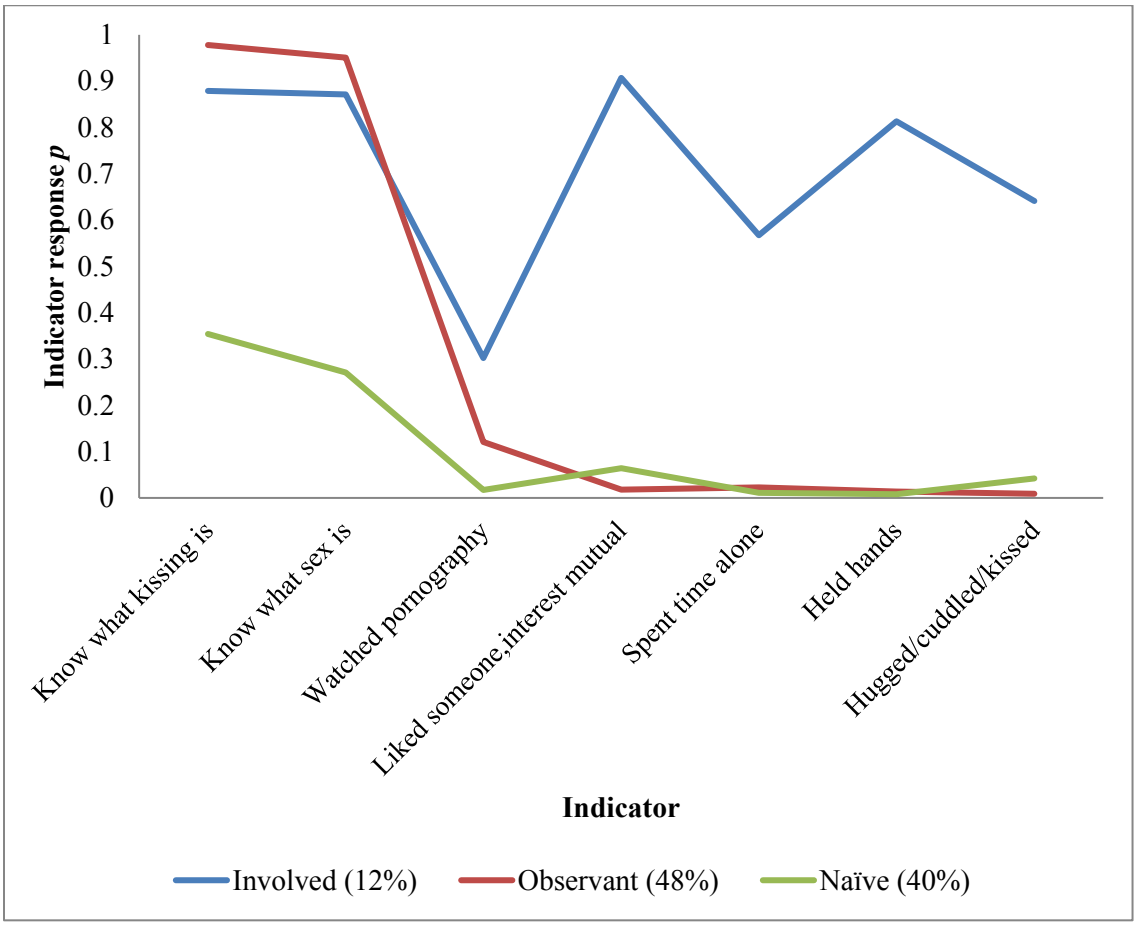


Table 5.5 Mean score of gender and heterosexual relationship attitudes, by most likely class membership (higher scores reflect higher agreement)

	Romantic/sexual experience typology (most likely latent class membership)								
	All			**Boys**			**Girls**		
	Class 1 Involved	Class 2 Observant	Class 3 Naïve	Class 1 Involved	Class 2 Observant	Class 3 Naïve	Class 1 Involved	Class 2 Observant	Class 3 Naïve
	Mean [SD]	Mean [SD]	Mean [SD]	Mean [SD]	Mean [SD]	Mean [SD]	Mean [SD]	Mean [SD]	Mean [SD]
Early heterosexual relationships	2.5 [1.0]***	1.9 [0.8]	1.8 [0.7]	2.4 [1.1]*	1.9 [0.8]	1.8 [0.7]	2.7 [0.7]***	1.9 [0.8]	1.8 [0.7]
Female sexual risk	4.0 [0.9]	4.0 [0.7]	3.8 [0.8]	3.9 [0.8]	4.0 [0.8]	3.7 [0.9]	4.1 [1.0]	4.1 [0.7]	4.0 [0.7]
Male sexual prowess	3.6 [0.9]*	3.5 [1.0]	3.2 [1.1]	3.3 [0.9]±	3.2 [1.0]	3.0 [1.0]	4.0 [0.6]	3.7 [0.9]	3.5 [1.0]
Male sexual responsibility	4.4 [0.9]±	4.4 [0.8]	4.2 [1.0]	4.4 [0.9]	4.3 [0.9]	4.1 [1.1]	4.3 [0.8]±	4.6 [0.8]	4.2 [0.9]

*** p<0.001, ** p<0.01, * p<0.05, ±p<0.1 using Kruskal-Wallis test of mean ranks by latent class membership (reference class: naïve group).

Table 5.6 Adjusted association between gender attitudes and being in the Involved vs. the Naïve and Observant groups, controlling for covariates.

Variable	Model 1		Model 2		Model 3		Model 4	
	Involved vs. Naïve	Involved vs. Observant	Involved vs. Naïve	Involved vs. Observant	Involved vs. Naïve	Involved vs. Observant	Involved vs. Naïve	Involved vs. Observant
	aOR (95% CI)	aOR (95% CI)	aOR (95% CI)	aOR (95% CI)	aOR (95% CI)	aOR (95% CI)	aOR (95% CI)	aOR (95% CI)
Female sexual risk	1.21 (0.55, 2.64)	1.04 (0.51, 2.14)	0.83 (0.35, 1.93)	0.79 (0.35, 1.79)	0.91 (0.36, 2.28)	0.88 (0.36, 2.15)	1.01 (0.36, 2.87)	1.0 (0.37, 2.73)
Male sexual prowess	1.12 (0.7, 1.79)	1.04 (0.66, 1.62)	1.25 (0.74, 2.1)	1.17 (0.71, 1.92)	1.16 (0.71, 1.89)	1.07 (0.67, 1.72)	1.06 (0.61, 1.85)	1.01 (0.59, 1.73)
Male sexual responsibility	1.24 (0.73, 2.11)	0.93 (0.54, 1.58)	1.67 (0.77, 3.63)	1.19 (0.6, 2.38)	1.68 (0.73, 3.86)	1.2 (0.57, 2.54)	1.48 (0.74, 2.99)	1.08 (0.56, 2.06)
Early heterosexual relationships	2.95 (1.79, 4.88)***	2.3 (1.47, 3.57)***	2.64 (1.46, 4.74)***	2.13 (1.29, 3.5)***	2.39 (1.34, 4.28)**	1.91 (1.17, 3.1)**	2.64 (1.5, 4.62)**	2.17 (1.34, 3.51)**
Age (ref: 11-12 years)			8.36 (2.67, 26.15)*	2.9 (0.7, 12.07)	8.07 (2.93, 22.23)**	2.74 (0.61, 12.26)	8.79 (3.0, 26.1)**	3.12 (0.62, 15.71)
Female (ref: Male)			1.12 (0.21, 5.83)	0.83 (0.17, 4.05)	1.33 (0.22, 7.98)	0.96 (0.17, 5.42)	1.64 (0.27, 10.08)	1.2 (0.2, 7.06)
Age*sex interaction			0.25 (0.03, 1.9)	0.62 (0.09, 4.07)	0.26 (0.03, 2.1)	0.67 (0.09, 4.71)	0.28 (0.03, 2.4)	0.67 (0.09, 5.33)
Started puberty			10.77 (3.73, 31.1)***	7.14 (1.68, 30.28)***	11.69 (3.66, 37.39)**	7.78 (1.65, 36.72)*	13.36 (5.8, 30.8)**	12.54 (4.53, 34.75)***
Born in the settlement			1.37 (0.48, 3.91)	1.55 (0.58, 4.14)	1.23 (0.42, 3.55)	1.38 (0.51, 3.7)	1.33 (0.44, 4.04)	1.5 (0.54, 4.15)
Single/double orphan			3.51 (1.07, 11.47)*	2.77 (0.97, 7.91)±	4.1 (1.27, 13.21)*	3.31 (1.13, 9.64)*	4.61 (1.44, 14.78)**	4.01 (1.32, 12.2)*
Household size ≥ 6 people (ref: 1-5 people)			1.37 (0.48, 3.95)	1.69 (0.65, 4.36)	1.4 (0.49, 4.03)	1.71 (0.66, 4.42)	1.36 (0.49, 3.73)	1.67 (0.65, 4.28)
Middle poor tertile (ref: poorest)			0.87 (0.27, 2.79)	1.21 (0.4, 3.61)	0.86 (0.25, 2.95)	1.2 (0.38, 3.84)	1.06 (0.34, 3.32)	1.39 (0.48, 4.04)
Least poor tertile (ref: poorest)			2 (0.66, 6.11)	1.68 (0.6, 4.7)	2.14 (0.66, 6.88)	1.81 (0.61, 5.42)	2.43 (0.68, 8.67)	2.07 (0.61, 7.02)
High religiosity (ref: low/no religion)			0.36 (0.07, 1.82)±	0.33 (0.1, 1.11)±	0.33 (0.09, 1.24)±	0.31 (0.08, 1.2)±	0.24 (0.06, 1.01)±	0.23 (0.05, 1.07)±

Close friends think having boy/girlfriends is important	1.8 (0.68, 4.81)	2.08 (0.82, 5.3)	1.91 (0.65, 5.66)	2.26 (0.81, 6.28)
Violence perpetration, opposite/both sex			13.99 (5.33, 36.68)**	10.37 (4.77, 22.54)**
Violence perpetration, only same sex			1.08 (0.3, 3.91)	0.78 (0.23, 2.58)
ACE categories (cont.)			1.09 (0.82, 1.46)	1 (0.78, 1.29)

*** p<0.001, ** p<0.01, * p<0.05, ±p<0.1

Table 5.7 Adjusted odds ratio of being in the Observant vs. the Naïve group, controlling for covariates.

	Model 1	**Model 2**	**Model 3**	**Model 4**
	Observant vs. Naïve	Observant vs. Naïve	Observant vs. Naïve	Observant vs. Naïve
	aOR (95% CI)	aOR (95% CI)	aOR (95% CI)	aOR (95% CI)
Female sexual risk	1.16 (0.77, 1.76)	1.05 (0.69, 1.58)	1.03 (0.68, 1.56)	1.01 (0.66, 1.54)
Male sexual prowess	1.08 (0.79, 1.47)	1.07 (0.77, 1.48)	1.08 (0.78, 1.5)	1.05 (0.76, 1.46)
Male sexual responsibility	1.34 (0.97, 1.85)±	1.4 (0.96, 2.03)±	1.4 (0.96, 2.03)±	1.38 (0.96, 1.97)
Early heterosexual relationships	1.29 (0.88, 1.87)	1.24 (0.82, 1.86)	1.25 (0.82, 1.92)	1.21 (0.79, 1.86)
Age 13-14 years (ref: 11-12 years)		2.88 (1.22, 6.76)*	2.94 (1.24, 7.02)**	2.82 (1.19, 6.7)*
Female (ref: Male)		1.35 (0.61, 3.02)	1.38 (0.61, 3.1)	1.37 (0.61, 3.1)
Age*sex interaction		0.41 (0.13, 1.33)	0.4 (0.12, 1.32)	0.41 (0.12, 1.4)
Started puberty		1.51 (0.82, 2.79)	1.5 (0.81, 2.78)	1.44 (0.78, 2.64)
Born in the settlement		0.89 (0.46, 1.71)	0.89 (0.46, 1.72)	0.89 (0.45, 1.74)
Single/double orphan		1.27 (0.56, 2.89)	1.24 (0.54, 2.86)	1.15 (0.49, 2.7)
Household size ≥ 6 people (ref: 1-5 people)		0.81 (0.45, 1.48)	0.82 (0.45, 1.5)	0.81 (0.45, 1.47)
Middle poor tertile (ref: poorest)		0.72 (0.36, 1.47)	0.72 (0.35, 1.47)	0.76 (0.36, 1.61)
Least poor tertile (ref: poorest)		1.19 (0.56, 2.52)	1.18 (0.55, 2.53)	1.17 (0.54, 2.54)
High religiosity (ref: low/no religion)		1.1 (0.38, 3.16)	1.08 (0.36, 3.22)	1.07 (0.37, 3.11)
Close friends think having boy/girlfriends is important			0.87 (0.43, 1.77)	0.85 (0.41, 1.74)
Violence perpetration, opposite/both sex				1.35 (0.37, 4.94)
Violence perpetration, only same sex				1.39 (0.64, 3.03)
ACE categories (cont.)				1.09 (0.87, 1.37)

*** p<0.001, ** p<0.01, * p<0.05, ±p<0.1

Chapter 6 : Conclusion

This dissertation focuses on the endorsement of gender norms among VYA (very young adolescents) globally and investigates the link between gender attitudes and emerging sexual experiences among VYA in a Nairobi slum, Kenya. This concluding chapter begins with a summary of each of the three manuscripts, followed by a discussion on the study strengths and limitations, public health implications, directions for future research, and overall conclusions.

CHAPTER 3 OVERVIEW (MANUSCRIPT I)

The first manuscript is a mixed-methods systematic review on the individual, interpersonal and community/societal potential influences on early adolescent gender attitudes. The study, published in *Plos One,* synthesized data on 46 quantitative, 31 qualitative and five mixed-methods peer-reviewed studies across 29 countries located primarily in North America and Western Europe. Findings from the synthesis of qualitative studies indicated that young adolescents across different cultural settings commonly endorse norms that perpetuate gender inequalities: specifically, norms that support toughness, competitiveness and heterosexual prowess as key masculinity characteristics, while simultaneously emphasizing femininity norms predicated on vulnerability, appearance and the shaming and control of the female body and sexuality. The results further showed that gender attitudes vary across sociodemographic factors such as biological sex, age, race/ethnicity and immigration status, and social class. For example, findings highlighted how VYA experience clashing cultural gender norm messages as a result of immigration, that they co-construct gender attitudes with other social categories such race (e.g. “black” versus “white” masculinities), and that lower socioeconomic opportunities and status might limit boys’ and girls’ abilities to live up to

local masculinity and femininity ideals. In most studies, boys were more likely than girls to support unequal gender norms and we found few examples where boys resisted or challenged such norms; rather, girls more commonly than boys spoke up against harmful gender stereotypes. This sex difference reflects differential socialization processes for boys and girls including different pressures and retributions from family and peers, who emerged as especially central influences. Girl's gender attitudes seem to be shaped by how parents and peers exert overt and covert control over their appearance and mobility, whereas boys' gender attitudes seem to be most closely shaped by their male peers' physical and verbal challenging of each other, including ridicule of those who fail to live up to local masculinity norms. We found mixed evidence on the role of schools in shaping gender attitudes: three quasi-experimental studies found a link between exposure to comprehensive sexuality education (CSE) and more equitable gender attitudes; however, there was also some evidence that teachers and other school professionals may reinforce stereotypical gender norms by placing higher social value on male dominated activities and by policing girls' appearance. Very few studies explored how exposure and use to different forms of media shape gender attitudes and more research is needed in this area. Taken together, the review indicates that while stereotypical gender attitudes are apparent early in adolescence, such beliefs are often ambivalent and thus amenable to change. Findings also highlight the need for standardized, culturally relevant measures to monitor changes in gender attitudes as young people go though adolescence.

CHAPTER 4 OVERVIEW (MANUSCRIPT II)

The second manuscript of this dissertation is a quantitative study of the prevalence and patterns of romantic and sexual experiences in a representative sample of n=365 VYA

aged 11-14 years in the Korogocho slum of Nairobi (Kenya), with the central aim to develop an inductive typology of such experiences and examine the characteristics of the identified sub-groups. The mean age of respondents was 12.4 years and two in three had started puberty. About one in six were single or double orphans. Among those with both parents alive, three in four reported feeling very close to their mother while less than half felt close to their fathers. Most were enrolled in school, with high academic aspirations.

Consistent with previous studies conducted with VYA in Nairobi [1] and elsewhere in sub-Saharan Africa [2-5], the prevalence of self-reported romantic and sexual experiences was low although this varied by the type of activity, with romantic interest being most commonly reported (14.6% indicated that they liked someone who also liked them back). About one in seven reported some form of non-coital (ranging from 2.5% touching of private parts to 10.5% for holding hands) or penetrative sexual experience (2.2% intercourse, 0.8% oral sex) Among those few (n=8) who reported ever having sexual intercourse, most (all five boys and two of the three girls) said that they wanted this to happen. Two in three reported knowing about kissing and sexual intercourse and at least 16% that they knew friends who had engaged in these activities, indicating that the awareness of sex was much higher than personal experiences.

Despite the overall low prevalence of activities, the seven indicator variables[14] included in the latent class model yielded over 40 different response patterns of romantic and sexual experiences. Results from the latent class analysis revealed three distinct sub-groups: 1) *Involved* (12%, high probability of awareness about sexual activities and involvement in romantic and non-coital activities, and moderate to low probability of

[14] Know what kissing is, know what sexual intercourse is, watched porn, ever liked someone romantically and they liked you back, spent time in private without adults around, held hands, hugged/cuddled or kissed.

watching pornography; 2) *Observant* (48%, high probability of awareness about sex but low probability of personal experiences); and 3) *Naïve* (40%, moderate to low probability of sexual awareness and even lower in relation to personal experiences). Class membership did not vary by sex, and the same model applied to both boys and girls. Involved VYA more commonly reported being in a relationship compared to the other two groups, and was the only group that reported fondling, vaginal or oral sex, and/or to have engaged in four or more types of sexual activities. Results from the adjusted latent class regression model showed that the odds of being in the Involved groups relative to the other two groups was higher among 13-14 year-olds, those who started puberty, were single/double orphans, and those who lived in households of greater relative wealth. While Observant VYA were more likely than the Naïve to be older, there were no other differences that distinguished these two groups.

Taken together, the findings suggest that while most VYA in the study context have not initiated sexual activities, there are distinct sub-groups of romantic and sexual experiences that would not have been captured by looking only at the prevalence of single indicators such as vaginal sex. Research and programming on adolescent SRHR thus need to use a wider range of measures to understand and respond to the emerging sexual needs of different sub-groups.

CHAPTER 5 OVERVIEW (MANUSCRIPT III)

For the third manuscript, I extended the previous analysis to focus on gender and relationship attitudes as potential predictors of romantic and sexual experiences. Specifically, this analysis explored the degree to which VYA in Korogocho endorse dominant gender norms of male and female sexuality, their permissiveness towards early

heterosexual relations, and the association between such attitudes with the typology identified in Chapter 4. In line with the systematic review, gender attitudes were fairly stereotypical but varied across a range of different covariates. Contrary to what was hypothesized, girls had higher agreement with female sexual risk and male sexual prowess norms than did boys, indicating greater endorsement of a sexual double standard. Girls also had borderline higher agreement with male sexual responsibility. Both boys and girls who reported lifetime perpetration or victimization of physical violence were more likely to endorse stereotypical gender norms, especially male sexual prowess. For boys, high endorsement of male sexual prowess and was also associated with a greater number of adverse childhood experiences, being born in Korogocho, and perceiving more permissive peer romantic norms. In contrast, among girls, high agreement with male sexual prowess and female sexual risk was more common among those from the least poor, and smaller, households.

Gender attitudes did not vary significantly across the three identified romantic and sexual experience sub-groups (Involved, Observant, Naïve) with exception for the Involved group having higher endorsement of male sexual prowess in bivariate analysis. However, this association did not remain significant in the adjusted analysis; rather, as hypothesized, permissive attitudes toward early relationships was a more powerful correlate of romantic and sexual experiences even though most boys and girls reported an overall low acceptance of such relations.

Overall, the findings highlight two key points. First, it is because of the fact that very few 11-14-year-olds were classified as Involved and most held unfavorable attitudes towards early heterosexual relationships that makes this age group critical for promoting

gender equal attitudes and providing boys and girls with the support that they need to negotiate sex and make respectful decisions in such relations. Second, given the interaction between personal attitudes with background (e.g. oprhanhood) and power-related factors (e.g. violence) in line with the Theory of Gender and Power [6,7], such efforts need to involve and address the social and structural factors that affect gender norms and SRHR.

STRENGTHS AND LIMITATIONS

This dissertation has a number of strengths and limitations that are important to consider. First, the use of a mixed-methods approach in the systematic review allowed the investigation of both quantitative correlates of gender attitudes as well as the potential *reasons* for such variations in the qualitative literature. Given that we were not able to include gray litterature it is however possible that we missed relevant studies that did not reach scientific journals. Another key strength is the focus on the much-neglected population of VYA in urban slums for which little SRHR data is available in sub-Saharan Africa, and the focus on improved measures of romantic and sexual experiences in this population. The quantitative study used LCA, one of the most powerful methods available for distinguishing sub-groups of individuals with similar response patterns. Because of its person-centered approach, LCA allows combining various indicators [8], and it further accounts for missing data and measurement errors; issues that are highly relevant in studies on adolescent sexuality. While LCA is appropriate to detect categorical groups of individuals with similar sexual behavior patterns, it is less applicable if the underlying construct of sexual behaviors is in fact continuous. With

origins in developmental psychology, LCA may also overlook behaviors that are completely externally driven [8].

Furthermore, the sample size was powered to explore each specific aim with sufficient power; however, we obtained a slightly smaller sample than intended and it is thus possible that some models lacked statistical power to detect significant associations. When stratified between boys and girls, the LCA models were less robust although they were invariant by sex. In addition, the quantitative study is cross-sectional and could therefore only describe associations and not assess their temporality. Nonetheless, the quantitative sample is representative of the population of VYA in the Korogocho slum, allowing comparisons with previous (and future) studies conducted in this setting.

As in any study exploring sexual behaviors among adolescents, social desirability bias [9,10] is possible in that respondents may have underreported romantic and sexual experiences because of the stigmatization of pre-marial sex. For example, are members of the Naïve group actually not aware of sex, or just not telling us that they do not know what sex is? Conversely, behaviors considered socially desirable either by the interviewer (e.g. gender equitable attitudes) or by their peers (e.g. proving "maturity" through having sex) could be over-reported [11]. The study relied on self-reported, retrospective assessments of behaviors; whether or not these reports represent the underlying "truth" is compromised both by difficulties to recall certain activities and by differential interpretations of questions (e.g. what is meant by fondling?) [9,11]. Post-hoc rationalization is also possible in that respondents may report experiences as "unwanted" if they regret engaging in behaviors (even though they might have been wanted at the time). Error can occur in each of these stages, and bias can be produced if the nature of

some questions is beyond the cognitive ability of the respondent, which may be the case with VYA [11]. Because many of the measures had never before been tested with this population in sub-Saharan Africa, piloting the questionnaire for face-validity was crucial in order to improve the selection and wording of questions. While we strived to include measures that had been validated with 10-14-year-olds, it is possible that some respondents did not understand the questions correctly. Additionally, because most reported experiences were heterosexual, the study results are not generalizable outside of this population. However, given the high burden of heterosexual transmission of HIV, as well as unintended pregnancies in Nairobi slums, a better understanding on of VYA heterosexual behaviors is highly relevant. Finally, this dissertation is embedded in a larger global project, and the measures developed will ultimately be integrated into Phase 2 of the GEAS, providing an opportunity to validate the identified typologies using a longitudinal design.

PUBLIC HEALTH AND RESEARCH IMPLICATIONS

As a body of work, this dissertation carries a number of implications and recommendations for adolescent SRHR programming. By focusing on the much-overlooked population of VYA, the study can both further our current understanding of gender attitudes and early sexual risk as well as put VYA on the research and programmatic agenda in sub-Saharan Africa. The findings should be communicated to public health professionals and researchers in adolescent SRHR globally, and to policy makers and program implementers at the national and sub-national levels in Kenya.

Taken together, this research shifts the focus from risk reduction approaches that concentrate on changing behaviors among older adolescents to upstream unfolding of

attitudes and behaviors. Early investments targeting emerging sexual behaviors, gender inequities and power dynamics will yield important social and economic benefits, as fewer harm-reduction investments will be required later in adolescence and adulthood [12]. The understanding of these processes thus underpins any effort to empower girls and boys to determine their future SRHR; a focus that is consistent with the Sustainable Development Goals (SGDs) related to *good health and well-being* (goal 3) and *gender equality* (goal 5), which also calls for ensuring universal access to SRHR in accordance with the Program of Action of the International Conference on Population and Development and the Beijing Platform for Action [13]. The focus on VYA who live in slums is further consistent with the goals related to *ending poverty* (goal 1) and *creating sustainable cities* (goal 11), including the upgrading of slums [13]. The findings can also be used to inform the accountability to Kenya's commitments to the Global Strategy for Women's, Children's and Adolescents' health (2016-2030), which in contrast to the previous version includes a specific focus on adolescents [14]. Two commitments from the Kenyan government are especially central: *implement policies, strategies and laws that support gender equality and women's empowerment* (iii); and *support and strengthen efforts in implementation of strategies that ensure access to information on sexual and reproductive health and services to adolescence* (iv) (pg. 44) [15].

The section that follows highlights key implications from this dissertation related to the importance of measurement, and the design (and relevance) of early prevention approaches related to gender equality and sexual risk in Nairobi slums.

Measurement matters

A persistent challenge in adolescent SRHR programming is how to move away from current generalized efforts directed at "young people", "adolescent girls" or "at-risk youth" which do not recognize the diversity of adolescents based on factors such as age, sex, poverty, disabilities, martial and schooling status, and culture [16]. In particular, few programs have adapted their content according to adolescents varying sexual trajectories [12,17], and evaluations tend to restrict indicators to the percent reporting sexual intercourse at certain ages. For example, the only indicator related to sexual behaviors among VYA in Kenya's 2015 National Adolescent Sexual and Reproductive Health Policy is "age at sexual debut among 12-14-year-olds" [18], which according to the findings from Chapter 4 does not capture the full range of intimate activities in this age group. A key implication of this dissertation is therefore the development of a typology of romantic and sexual experiences among VYA residing in an urban slum, which to date has not been done. This typology can be used to guide future interventions by identifying and tailoring program models line with the specific needs of certain sub-groups. The typology can also be used both in formative research, and to monitor and evaluate SRHR programming with VYA, as most existing measures were not operationalized specifically for this age group [19]. A critical next step will to build upon and validate the typology in larger samples across different cultural and socioeconomic contexts, and over time. For starters, the measures will be used in the longitudinal phase of the GEAS, for which questions related to sexual intentions, self-efficacy and the quality of intimate relationships will be added.

This dissertation also adds important lessons in the measurement of gender attitudes and in particular around the complexity of quantifying agreement with gender norms. First, as shown by the systematic review, gender attitudes in early adolescence tend to be ambiguous (e.g. supporting both harmful as well as more equal norms). Secondly, results from the quantitative study indicate that attitudes at this age may not necessarily be the most useful measure for predicting behaviors. Of equal importance is to measure other social and structural influences on sexual behaviors given that VYA often lack the agency to act on attitudes, and are also more dependent on their parents and surrounding environments [12,20]. Third, it is important to think carefully about how attitudinal questions are phrased. For example, just because girls in this study had higher agreement with sexual double standard attitudes than boys does not necessarily mean that are more likely to support such norms. Many of the statements were phrased in a *descriptive* rather than a *prescriptive* manner; for example, all items in the male sexual prowess scale referred to what boys *are* doing rather than what boys *should* be doing. As Bicchieri [21] notes, attitudes are conditioned on the social expectation of others , i.e. they are strongly influenced by what others do or (dis)approve of. Future research should therefore include questions that tap not only individual attitudes but also the extent to which VYA believe that their peers endorse gender norms, which may be a stronger predictor of behaviors.

A window of opportunity (waiting to be opened)

The findings from this dissertation can also be used to argue for why investment in the VYA population matters for adolescent SRHR in Kenya. With the exception of age at first sex among 12-14-year-olds, and percent of 10-14-year-olds with comprehensive

knowledge about HIV, VYA are missing from the Kenyan National Adolescent SRH Policy [18], which focuses largely on 15-19 -year-olds. Four key points could be communicated to the Kenyan government to advocate for a specific focus on VYA.

First, stereotypical gender attitudes supporting sexual double standard norms are present already in the early adolescent years both globally and in Nairobi slums. However, these attitudes have yet to be translated into behaviors, making this period of life essential for promoting more equitable norms. Indeed, the fact that VYA constitute a relatively healthy population is the very reason for why increased resources should be earmarked to this age group. Even in the Korogocho slum, an environment of high social and physical risk, most 11-14 -year-olds are enrolled in school, have high academic aspirations, feel connected to their parents (more so to mothers), few report use of alcohol or drugs, and few that they have initiated sexual intercourse. This picture changes over the course of adolescence: evidence clearly shows that young people enter their teens and puberty, they face differential pressures (with boys often having to help support the family financially, and girls being increasingly restricted to move outside the household), resulting in diverging health trajectories [22,23]. It is therefore essential to strengthen positive assets during early adolescence and help equip boys and girls to negotiate both the timing and circumstances of sexual relations. This is particularly true for "Observant" VYA who are only just starting to become aware about sexual relations, but also for those "Naïve". One way of doing this is to ensure access to high-quality CSE in primary school that is both age and developmentally appropriate [24].

Secondly, this dissertation shows that while few 11-14-year-olds report having had intercourse, not all are sexually "inexperienced". Indeed, some have already begun to

explore romantic and non-coital activities, and these VYA differ from those who have not: they are more likely to be older, to have started puberty, to hold permissive attitudes towards sexual relationships, to be orphans, and to have perpetrated violence against the opposite or both sexes. Orphanhood and violence are particularly important given that these factors do not only increase the risk of adverse SRH outcomes [25,26], but are modifiable risk-factors.

The third message to policy makers is therefore to strengthen existing social protection programs for VYA in slums who have lost one or both parents. Kenya was one of the first sub-Saharan African countries to invest in social protection for orphans [27] and has launched a number of initiatives such as the Government of Kenya Cash Transfer for Orphans and Vulnerable Children Program (CT-OVC), which provide monthly unconditional transfers of approximately $20 to households caring for OVC (over 280,000 OVC had been reached as of 2012). A follow-up evaluation in 2011 found that the program reduced the odds of sexual debut among orphans living in treatment households compared to those in control households, an impact that according to the authors may have been indirectly achieved through increased school retention [28]. However, this evaluation was conducted with 15-19 -year-olds and did not assess sexual behaviors prior to interventions. Additional studies are needed to explore the impact of cash transfers and other social protection programs on sexual behaviors throughout the course of adolescence. It is also important to consider whether and how programs can be adapted to different types of orphanhood (e.g. maternal vs. paternal). Future research should also focus on the role of fathers more generally as VYA in the current study appeared to be less connected to their father than mothers.

Furthermore, the central role of violence as a correlate of both masculinity attitudes and sexual experiences support the Kenya National SRH Policy action to "promote male involvement in prevention of sexual and gender based violence services" [18], as this will be key to addressing violent masculinity norms. The findings from the systematic review clearly show how young adolescent boys use violence to control and reinforce gendered behaviors and identities. Interventions thus need to support boys to challenge and resist such stereotypes, for example by using *gender transformative* approaches that offer critical reflection on rigid masculinity norms, model alternatives, and engage men in social action to build change in their communities [29,30].

However, while the relevance of involving boys to change harmful gender norm is clear, the findings from this dissertation are in line with recommendations for programs that are not only gender transformative but *gender synchronized* in that they involve girls as well as boys [31]. While more evidence is needed on gender synchronized programming with VYA, one example of an intervention that uses this approach is Save the Children's *CHOICES* curriculum discussed in Chapter 3, which works with 10-14 -year-old boys and girls in Nepal to question and discuss gender roles and norms. The addition of components to include parents and community members to this curriculum [32] underscore the need to move beyond an individual focus to include adolescents' family and peer networks as well as wider social institutions. Further research is needed on structural factors; for example, how the increased use of smartphones and other forms of media in sub-Saharan Africa [33] shape adolescent gender attitudes as well as sexual behaviors.

Finally, more research is needed around the "tipping point" of norm change. Norms rarely change over night, and while it is important to address individual attitudes it is equally important to understand the barriers and facilitators to bending and transforming norms at the group and community level [34]. In addition, as noted by the *Young Lives* study which has followed cohorts of over 12,000 children and young people in Ethiopia, India, Peru and Vietnam,"adolescents' transitions are far from uniform", and by pinpointing specific age bands we risk missing those who do not follow the norm [23]. Thus, while early adolescence an opportune period to intervene, it does not mean that everything can be "fixed" during this life stage.

CONCLUSION

This dissertation contributes to the field of early adolescent SRHR in three important ways. First, it provides a synthesis of the global evidence on factors that shape gender attitudes among 10-14 -year-olds. The findings indicate that unequal gender attitudes are common already among VYA, and that the construction of such attitudes is strongly influenced by family members and peers with differential pressures and repercussions for boys and girls. The review highlights the need to not only focus early adolescence in all relevant SDGs (health, gender equality, education) but also the need to promote gender equitable norms in adolescent-focused programming and policies. Secondly, the dissertation introduces new data on gender attitudes and romantic/sexual activities among 11-14 -year-olds in slum neighborhoods in Nairobi (Kenya). A core contribution is the proposed typology of romantic and sexual experiences, which can be used (and further adapted) to monitor and evaluate SRHR programming with VYA in slums. Findings revealed three distinct sub-groups of romantic and sexual experiences that would not

have been captured by looking only at the prevalence of single indicators such as vaginal sex, indicating the need for broader and age-appropriate measures. Third, the study adds to our current understanding on the endorsement and correlates of stereotypical gender norms related to sexuality during transitions in adolescence. Specifically, the results showed that while most VYA in the study context have not yet initiated romantic and sexual activities, many are aware of sexual activities and endorse sexual double standard norms for boys and girls. These findings confirm early adolescence as window of opportunity to promote healthy sexual development and prevent sexual risk-taking.

CHAPTER 6 REFERENCES

1. Beguy D, Mumah J, Wawire S, Muindi K, Gottschalk L, Kabiru C. Status report on the sexual and reproductive health of adolescents living in urban slums in Kenya. STEP UP technical working paper. Nairobi: African Population and Health Research Center; 2013.

2. Diop N, Diagne A. Improving communication between parents and adolescents on reproductive health and HIVAIDS. Frontiers in Reproductive Health, Population Council; 2008. 54 p.

3. Glover EK, Bannerman A, Pence BW, Jones H, Miller R, Weiss E, et al. Sexual health experiences of adolescents in three Ghanaian towns. Int Fam Plan Perspect. 2003;29: 32-40.

4. Magnani RJ, Karim AM, Weiss LA, Bond KC, Lemba M, Morgan GT. Reproductive health risk and protective factors among youth in Lusaka, Zambia. J Adolesc Health. 2002;30: 76-86.

5. Exavery A, Lutambi AM, Mubyazi GM, Kweka K, Mbaruku G, Masanja H. Multiple sexual partners and condom use among 10-19 year-olds in four districts in Tanzania: What do we learn? BMC Public Health. 2011;11: 1-9.

6. Connell R. Gender and power: Society, the person and sexual politics: John Wiley & Sons;1987.

7. Wingood GM, DiClemente RJ. Application of the Theory of Gender and Power to examine HIV-related exposures, risk factors, and effective interventions for women. Health Education & Behavior. 2000;27: 539-565.

8. Bergman LR, Magnusson D. A person-oriented approach in research on developmental psychopathology. Dev Psychopathol. 1997;9: 291-319.

9. Catania JA, Turner H, Pierce RC, Golden E, Stocking C, Binson D, et al. Response Bias in Surveys of AIDS-Related Sexual Behavior. Methodological Issues in AIDS Behavioral Research. In: Ostrow DG, Kessler RC, editors. AIDS Prevention and Mental Health. New York: Plenum Press; 2002: pp. 133-162.

10. Fenton KA, Johnson AM, McManus S, Erens B. Measuring sexual behaviour: methodological challenges in survey research. Sex Transm Infect. 2001;77: 84-92.

11. Brener ND, Billy JO, Grady WR. Assessment of factors affecting the validity of self-reported health-risk behavior among adolescents: evidence from the scientific literature. J Adolesc Health. 2003;33: 436-457.

12. Igras SM, Macieira M, Murphy E, Lundgren R. Investing in very young adolescents' sexual and reproductive health. Global public health. 2014: 1-15.

13. UN. Sustainable Development Goals. Available: http://www.un.org/sustainabledevelopment/sustainable-development-goals/l

14. Every Woman Every Child. The Global strategy for women's, children's and adolescents' health (2016-2030). 2015.

15. Every Woman Every Child. Committments in support of the Global Strategy for Women's, Children's and Adolescents' Health (2016-2030). New York, NY: Every Woman Every Child; 2015.

16. Bruce J, Chong E. The diverse universe of adolescents, and the girls and boys left behind: a note on research, program and policy priotiries. Background paper to the report *Public Choices, Private Decisions: Sexual and Reproductive Health and the Millennium Development Goals*. New York, NY: UN Millenium Project; 2006.

17. Miller KS, Clark LF, Wendell DA, Levin ML, Gray-Ray P, Velez CN, et al. Adolescent heterosexual experience: A new typology. Journal of Adolescent Health. 1997;20: 179-186.

18. Republic of Kenya. National Adolescent Sexual and Reproductive Health Policy. 2015.

19. Palmer L. Advancing promising program and research/evaluation practices for evidence-based programs reaching very young adolescents: A review of the literature. Washinton, DC: Institute for Reproductive Health, Georgetown University; 2010.

20. McCarthy K, Brady M, Hallman K. Investing when it counts: Reviewing the evidence and charting a course of research and action for very young adolescents. New York: Population Council. 2016.

21. Bicchieri C. The Grammar of Society: the Nature and Dynamics of Social Norms. New York: Cambridge University Press;2006.

22. Kågesten A, Gibbs S, Blum RW, Moreau C, Chandra-Mouli V, Herbert A, et al. Understanding factors that shape gender attitudes in early adolescence globally: A mixed-methods systematic review. PLOS ONE. 2016;11: e0157805.

23. Winter F. Shaping aspirations and outcomes: Gender and adolescence in Young Lives. Young Lives policy paper 9. Oxford, UK: Young Lives; 2016.

24. UNESCO. International Technical Guidance on Sexuality Education: An Evidence-informed approach for schools, teachers and health educators. Paris: UNESCO; 2009.

25. Dunkle KL, Jewkes RK, Brown HC, Gray GE, McIntryre JA, Harlow SD. Gender-based violence, relationship power, and risk of HIV infection in women attending antenatal clinics in South Africa. Lancet. 2004;363: 1415-1421.

26. Palermo T, Peterman A. Are female orphans at risk for early marriage, early sexual debut, and teen pregnancy? Evidence from sub-Saharan Africa. Stud Fam Plann. 2009;40: 101-112.

27. Akuma J. Social protection for orphaned and vulnerable children in Kenya: Initiatives, opportunities and challenges. International Advisory Board. 2014: 235.

28. Handa S, Halpern CT, Pettifor A, Thirumurthy H. The government of Kenya's cash transfer program reduces the risk of sexual debut among young people age 15-25. PLoS ONE. 2014;9: e85473.

29. Barker G, Ricardo C, Nascimento M, Olukoya A, Santos C. Questioning gender norms with men to improve health outcomes: Evidence of impact. Glob Public Health. 2010;5: 539-553.

30. Pulerwitz J, Barker G, Segundo M, Nascimento M. Promoting more gender-equitable norms and behaviors among young men as an HIV/AIDS prevention strategy. *Horizons final report*. Washington, DC: Population Council; 2006.

31. Greene M, Levack A. Synchronizing gender strategies: A cooperative model for improving reproductive health and transforming gender relations. Population Reference Bureau; 2010.

32. Save the Children. Voices. Using testimonials to Influecing parent's support for very young adolescents' gender equality in Nepal. Save the Children; 2014.

33. GSMA. The mobile economy. Sub-Saharan Africa 2015. GSMA; 2015.

34. Marcus R, Harper C. Gender justice and social norms – processes of change for adolescent girls. Towards a conceptual framework 2. Overseas Development Institute (ODI); 2014.

Appendices

APPENDIX 2.1 INVITATION LETTER FROM APHRC

November 11, 2015

To Whom It May Concern

Re: Pre-Doctoral Fellowship for Anna Kaagesten: Passport Number 86222071

This is to confirm that Ms. Anna Kaagesten is a PhD student in the Department of Population, Family and Reproductive Health at the Johns Hopkins Bloomberg School of Public Health, USA. Anna will be hosted as a pre-doctoral fellow at the African Population and Health Research Center (APHRC) from November 16, 2015 to December 31, 2015.

APHRC is an international non-profit, research institute committed to conducting high-quality research on urbanization, population, health, and education issues facing sub-Saharan Africa. Our mission is to be a global center of excellence, consistently generating and delivering relevant scientific evidence for policy and action in Africa.

APHRC will provide Anna a stimulating and exciting environment for developing her work and thinking through the issues that are critical to making sense of the data that her proposed study will generate. Anna's research addresses gender norms among young adolescents in Nairobi's informal settlements. She is especially interested in gender influences on sexual decision-making and access to comprehensive adolescent health services in poor urban informal settlements. Anna's research interests align strongly with ongoing studies at APHRC.

During the period of her stay at the Center, Anna will also work closely with senior APHRC researchers who will provide her personalized support and mentorship. She will be directly supervised by Dr. Caroline W. Kabiru, a research scientist, with longstanding experience in youth sexual and reproductive health issues.

If you require any further information regarding this letter, please do not hesitate to contact me on +254(20)400 1000 or cizugbara@aphrc.org

Yours sincerely,

Chimaraoke Izugbara, PhD

Program Head, Population Dynamics and Reproductive Health

African Population and Health Research Center, Inc.
APHRC Campus, 2nd Floor, Manga Close-Off Kirawa Road, Kitisuru • P.O. Box 10787, 00100 - Nairobi, Kenya
Office Line: +254 20 4001000 • Office Cell: +254 722 205 933 or 733 410 102 • Fax: +254 20 4001101
Email: info@aphrc.org • Website: www.aphrc.org • Twitter: @aphrc

APPENDIX 2.2 SAMPLE SIZE CALCULATION

There is currently no closed-form equation or gold-standard approach for calculating sample size and power in LCA. Sample size is typically guided by model *estimability*; that is, having enough data to estimate parameters with precision. Estimability depends on the size of each latent class, the number of classes to be fit, prevalence of response to indicators as well as the number of indicators. Overall, the sample size needs to be large enough to clearly distinguish between classes (i.e. item response probabilities and corresponding standard errors should not overlap). Scholars have suggested a minimum sample size ranging from 300 to 1000 for using LCA. Finch and Bronk concluded that an N of 500 would be a "worthy goal" for LCA based on results from previous studies[1]. Similarly, based on multiple Monte Carlo simulations and models using empirical data, Dziak et al. recently estimated that a minimum sample of N=330 would be required to fit a 9-indicator, 3 class model with 80% power[2]. Based on these studies, I chose a mid-point sample size of N=400 and ran a series of Monte Carlo simulations using MPLUS to estimate the power and model fit for different parameter and class scenarios.

The results shown below are based on the hypothesized 3-class model described in the methods section. In conducting the simulations, I followed the approach outlined by Dzinak et al (ibid) and considered both unequal (60%, 30%, 10%) and equal (34%, 33%, 33%) latent class probabilities. I combined this with different scenarios for item-response probabilities indicating strong classification (0.9 and 0.1), medium classification (0.8 and 0.2) and low classification (0.7 and 0.3). This resulted in six scenarios as shown in the table below: unequal-high, equal-high, unequal-medium, equal-medium, unequal-low and equal-low. For each scenario, I simulated 1000 data sets and estimated the AIC, BIC and power to reject the null hypothesis that each parameter is equal to zero at an alpha level of 0.05. I also considered the same scenarios for a 2-class model and different sample sizes (results not shown). The simulation for a sample size of 400 showed that the statistical power for almost all parameters in a 3-class model with high classification was above 80%, and entropy was above 0.9 (Models 5-6). A couple of parameters in the third class had power below 80%; these included more physically intimate behaviors for which the anticipated prevalence is lower and this may in turn affect their estimability. The medium classification scenario (Models 3-4) had lower power than the high quality scenario; yet, results indicated that most parameters could be fitted with 80% power, and entropy was around 0.7. The

[1] Finch WH, Bronk KC. Conducting Confirmatory Latent Class Analysis Using Mplus. Structural Equation Modeling: A Multidisciplinary Journal. 2011;18: 132-151.
[2] Dziak JJ, Lanza ST, Tan X. Effect Size, Statistical Power and Sample Size Requirements for the Bootstrap Likelihood Ratio Test in Latent Class Analysis. Structural equation modeling : a multidisciplinary journal. 2014;21: 534-552.

low classification scenario (Models 1-2) indicated that all parameters in class 1 could be fit at 90% power, while the power for parameters in the other two classes was lower. The model results further favored models allowing latent class probabilities to vary.

Overall, results from these simulations along with findings by the two studies above indicate that it is possible to fit a 3-class model with at least 6 indicators at 80% power using a sample size of **400**.

Result from Monte Carlo Simulations for different scenarios of latent class prevalence (η) and item response probabilities (π)

	Model 1 (low unequal)				**Model 2 (low equal)**			
	C1	**C2**	**C3**	**Power***	**C1**	**C2**	**C3**	**Power***
η	0.6	0.3	0.1		0.34	0.33	0.33	
π								
1	0.3	0.7	0.7	C1>90%, C2<60%, C3>40%	0.3	0.7	0.7	C1>90%, C2<60%, C3>40%
2	0.3	0.7	0.7	C1>90%, C2<60%, C3>40%	0.3	0.7	0.7	C1>90%, C2<60%, C3>40%
3	0.3	0.7	0.7	C1>90%, C2<60%, C3>40%	0.3	0.7	0.7	C1>90%, C2<60%, C3>40%
4	0.3	0.7	0.7	C1>90%, C2<60%, C3>40%	0.3	0.7	0.7	C1>90%, C2<60%, C3>40%
5	0.3	0.3	0.7	C1>90%, C2<60%, C3>40%	0.3	0.3	0.7	C1>90%, C2<60%, C3>40%
6	0.3	0.3	0.7	C1>90%, C2<60%, C3>40%	0.3	0.3	0.7	C1>90%, C2<60%, C3>40%
	Model 3 (medium unequal)				**Model 4 (medium equal)**			
	C1	**C2**	**C3**	**Power***	**C1**	**C2**	**C3**	**Power***
η	0.6	0.3	0.1		0.34	0.33	0.33	
π								
1	0.2	0.8	0.8	C1-C2>90%, C3>80%	0.2	0.8	0.8	C1-C3 > 90%
2	0.2	0.8	0.8	C1-C2>90%, C3>75%	0.2	0.8	0.8	C1-C3 > 90%
3	0.2	0.8	0.8	C1-C2>90%, C3>75%	0.2	0.8	0.8	C1-C3 > 90%
4	0.2	0.8	0.8	C1-C2>90%, C3>75%	0.2	0.8	0.8	C1-C3 > 90%
5	0.2	0.2	0.8	C1>90%, C2>75%, C3>35%	0.2	0.2	0.8	C1>90%, C2-C3>65%
6	0.2	0.2	0.8	C1>90%, C2>75%, C3>40%	0.2	0.2	0.8	C1>90%, C2-C3>65%
	Model 5 (high unequal)				**Model 6 (high equal)**			
	C1	**C2**	**C3**	**Power***	**C1**	**C2**	**C3**	**Power***
η	0.6	0.3	0.1		0.34	0.33	0.33	
π								
1	0.1	0.9	0.9	C1-C3 > 90%	0.1	0.9	0.9	C1-C3 > 90%
2	0.1	0.9	0.9	C1-C3 > 90%	0.1	0.9	0.9	C1-C3 > 90%
3	0.1	0.9	0.9	C1-C3 > 90%	0.1	0.9	0.9	C1-C3 > 90%
4	0.1	0.9	0.9	C1-C3 > 90%	0.1	0.9	0.9	C1-C3 > 90%
5	0.1	0.1	0.9	C1>90%, C2-C3>80%	0.1	0.1	0.9	C1>90%, C2-C3>75%
6	0.1	0.1	0.9	C1>90%, C2-C3>70%	0.1	0.1	0.9	C1>90%, C2-C3>75%

* Power = proportions of Monte Carlo Simulation replications (N=1000) for which the H_0 that parameters = 0 is rejected for each parameter at alpha=0.05 level (two sided).

Note: Items 1-6 could represent 1=spending time together/holding hands, 2=sexted, 3=hugged/cuddled, 4=kissed, 5=expecting to initiate sex, 5=touched private parts, 6=vaginal/oral sex. Models with 6 (not 9) parameters were fitted because of restrictions in the MPLUS Demo version.

APPENDIX 2.3 MASCULINITY AND FEMININITY ITEM FREQUENCIES

Masculinity norms						
Nr	**Item name**	**Indicator**		**Agree* (1-2)**	**Neither (3)**	**Disagree* (4-5)**
			n	**%**	**%**	**%**
19	BOYATTRGIRL	Boys are supposed to be attracted to girls	365	25.8	6.3	67.9
20	BOYMANYGF1	It is ok for a boy to have a lot of girlfriends	359	12.8	3.6	83.6
21	BOYCHASEGIRL	It's in boys' nature to chase girls	357	34.5	8.1	57.4
22	BOYHOMOATTRACT	Boys who are attracted to other boys should be treated the same as everyone else	354	36.7	8.8	54.5
31	BOYSHOWOFF	Boys have girlfriends to show off to their friends	357	49.9	5.3	44.8
32	BOYPRESSURE	Boys feel they should have girlfriends because their friends do	360	36.1	6.1	57.8
33	BOYPLAYGIRL	Boys have girlfriends for fun more than love	357	48.2	9.2	42.6
34	BOYNOLOVE	Boys tell girls they love them when they don't	361	57.6	9.4	33.0
35	BOYLOVEGF	Boys have girlfriends because they love them	360	44.2	12.5	43.3
36	BOYTIMEGIRL	It's ok for a boy your age to talk and spend time with a girl alone	363	17.9	9.1	73.0
37	BOYRELGIRL	It's ok for a boy your age to be in a relationship with a girl as more than friends	365	15.1	6.6	78.4
38	BOYHOMOREL	It's ok for a boy your age to be in a relationship with another boy as more than friends	364	13.2	3.8	83.0
39	BOYMANYGF2	It is ok for a boy to have more than one girlfriend at a time	362	10.2	5.2	84.5
40	BOYFINDLOVE	Boys should have girlfriends to discover love	358	25.1	8.7	66.2
41	BOYHOMOPARENT	Parents should treat their son the same if he loves a boy or a girl	355	49.3	9.9	40.8
42	BOYDISTRACT	A boy should avoid having a girlfriend because it will distract him from his school work	363	78.5	6.6	14.9
43	BOYTROUBLE	A boy will get in trouble if he has physical contact with a girl even if she is willing	364	66.2	8.0	25.8
44	BOYCOMPETE	Boys generally compete for the prettiest girls	358	75.7	7.0	17.3
45	BOYLIKESEXY	Boys like girls who wear revealing clothes	364	52.7	8.8	38.5
52	BOYPROVIDE	Boys should not have sexual intercourse until they can provide for a	359	81.6	3.9	14.5

		family				
53	BOYPREGNO	Boys should be careful not to get a girl pregnant	359	87.2	3.9	8.9
56	BOYHOMOSEX	It is ok for a boy to have sexual intercourse with another boy	361	5.0	3.6	91.4
57	BOYSEXOLDER	It is ok for a boy to have sexual intercourse with someone who is a lot older than he is	359	4.7	4.5	90.8
58	BOYBORED	Boys lose interest in a girl after they have sex with her	354	50.8	12.7	36.4
59	BOYFOOLSEX	Boys fool girls into having sex	355	72.1	6.8	21.1
60	BOYPREGRESP	A boy should take responsibility if he gets a girl pregnant	359	80.5	5.3	14.2
54	BOYMARRY	A boy should only have sexual intercourse with a girl he wants to marry	360	49.7	8.6	41.7
55	BOYLOVE	A boy should only have sexual intercourse with someone he loves	359	42.9	8.4	48.7
Femininity norms						
Nr	**Item name**	**Indicator**		**Agree* (1-2)**	**Neither (3)**	**Disagree* (4-5)**
			n	**%**	**%**	**%**
29	GIRLCOVER	Girls should cover up or they will attract unwanted sexual attention	360	74.4	5.8	19.7
30	GIRLNOSEDUCE	Girls should be careful about how they look so they aren't seen as trying to seduce men	364	75.0	6	19.0
31	GIRLBLAME	It's a girl's fault if boys come onto them	361	39.3	8.9	51.8
32	GIRLSEDUCE	Girls wear short dresses to get boys' attention	362	69.6	5.2	25.1
33	GIRLSDRESS	Girls should be free to dress as they want	363	33.3	4.1	62.5
34	GIRLWATCH	Girls should be aware that boys can take advantage of them	364	81.3	4.4	14.3
35	GIRLFIGHT	Girls should fight back when boys take advantage of them	363	64.5	10.2	25.3
36	GIRLPROTECT	Girls should protect their reputation above anything else	364	87.6	4.9	7.4
37	GIRLDISTBOY	Girls should keep boys at a distance	360	63.6	7.2	29.2
38	GIRLNOALONE	It's not good for a girl to spend time alone with a boy	364	66.2	4.1	29.7
39	GIRLSTRUST	Girls should trust boys to help them when they need it	363	63.1	6.1	30.8
40	GIRLTORMENT	Girls play with boys' minds	359	58.8	10	31.2
41	GIRLGIFTS	A girl might get a boyfriend because she wants money or gifts	359	68.8	6.7	24.5
42	GIRLIGNORE	Girls ignore boys who are nice to them, even if they like them	361	54.3	14.4	31.3
43	GIRLTIMEBOY	It is ok for a girl and boy your age to talk and spend time together	364	26.9	9.3	63.7

		alone*				
44	GIRLRELBOY	It is ok for a girl your age to be in a relationship with a boy as more than just friends*	362	14.9	5.5	79.6
45	GIRLHOMOREL	It is ok for a girl your age to be in a relationship with a girl as more than just friends*	360	10,0	4.2	85.8
46	GIRLMANYBF	It is OK for a girl to have more then one boyfriend at the same time*	362	13.3	3.3	83.4
47	GIRLNOSTUDY	A girl will lose interest in studying if she has a boyfriend	364	81.3	2.2	16.5
48	GIRLTROUBLE	Girls often get into "trouble" when they have boyfriends	362	80.1	4.1	15.7
49	GIRLBAD	Girls who have boyfriends are irresponsible	358	64.2	8.1	27.7
50	GIRLPOPULAR	Girls who have boyfriends are popular	360	44.0	9.7	46.3
51	GIRLSTUDYFIRST	A girl can have a boyfriend as long as she continues working well in school*	361	36.7	8.3	55
52	GIRLRUMOUR	Girls are the victims of rumors if they have boyfriends	361	66.5	10.5	23
53	GIRLHOMOATTRACT	Girls who are attracted to other girls should not be teased*	358	37.2	15.4	47.5
54	GIRLHOMOPARENT	Parents should treat their daughter the same whether she loves a boy or a girl*	361	47.9	11.9	40.2
55	GIRLBFNORMAL	It’s normal for a girl to want a boyfriend at your age*	363	18.2	8	73.8
56	GIRLPREGBLAME	It's the girl's fault if she gets pregnant	363	53.4	7.4	39.1
57	GIRLPREGOK	If an adolescent girl gets pregnant she should not be looked down upon*	361	70.9	8.9	20.2
58	GIRLPREGSHAME	Adolescent girls who get pregnant should be ashamed	362	40.3	9.7	50.0
59	GIRLSEXNOPREG	It is ok for a girl to have sex as long as she avoids getting pregnant*	360	18.1	6.9	75.0
60	GIRLHOMOSEX	It is ok for a girl to have sex with another girl*	356	4.2	4.2	91.6
62	GIRLDUMPED	If a girl says “no” to sex her boyfriend will dump her	356	55.9	9.8	34.3
63	GIRLSEXOLDER	It is ok for a girl to have sex with people who are a lot older than she is*	357	7.3	5.3	87.4
64	GIRLTRICKED	Girls should avoid boys because they trick them into having sex	361	72.0	6.6	21.3
61	GIRLLOVE	A girl should only have sex with someone she loves	357	40.1	9.2	50.7

*Responses were measured on a 5-point Likert-scale ranging from totally agree (1) to totally disagree (5). Proportions are presented for categories merging totally agree/agree (1-2) and totally disagree/disagree (4-5).

APPENDIX 2.4 PRELIMINARY MASCULINITY AND FEMININTY ITEM FACTOR LOADINGS

Masculinity items	**All items (4 Factor solution)**					**Refined (3 factor solution)**				**Refined (2 factor solution)**		
Items	**M1**	**M2**	**M3**	**M4**	**Uniq**	**M1**	**M2**	**M3**	**Uniq**	**M1**	**M2**	**Uniq**
44. BOYCOMPETE	**0.47**	-0.38	0.04	-0.26	0.43	0.35	-0.54	0.02	0.4	**0.75**	-0.14	0.41
59. BOYFOOLSEX	**0.51**	-0.22	-0.15	-0.04	0.57	**0.48**	-0.27	-0.09	0.57	**0.66**	-0.09	0.57
58. BOYBORED	**0.54**	-0.09	-0.2	0.2	0.62	**0.6**	-0.05	-0.08	0.62	**0.58**	0.05	0.67
45. BOYLIKESEXY	**0.67**	0.06	-0.23	0.14	0.58	**0.75**	0.1	-0.19	0.52	**0.57**	0.06	0.67
33. BOYPLAYGIRL	**0.53**	-0.07	0	0.18	0.63	**0.59**	-0.03	0.1	0.6	**0.55**	0.24	0.63
34. BOYNOLOVE	**0.42**	-0.14	0.03	-0.04	0.75	**0.4**	-0.15	0.02	0.76	**0.48**	0.05	0.76
31. BOYSHOWOFF	**0.75**	0.24	-0.01	0.06	0.55	**0.66**	0.16	0.04	0.62	**0.45**	0.28	0.71
32. BOYPRESSURE	**0.55**	0.08	0.27	-0.08	0.64	**0.45**	0.02	0.23	0.71	**0.39**	0.34	0.72
37. BOYRELGIRL	-0.03	-0.04	**0.72**	0.03	0.47	-0.05	0	**0.73**	0.48	-0.02	**0.67**	0.56
39. BOYMANYGF2	0.05	0.17	**0.58**	0.04	0.58	-0.02	0.13	**0.59**	0.6	-0.1	**0.62**	0.61
57. BOYSEXOLDER	0.09	0.08	-0.04	**0.88**	0.25	0.2	0.24	**0.45**	0.66	-0.01	**0.6**	0.65
20. BOYMANYGF1	-0.11	-0.1	**0.77**	-0.06	0.49	-0.14	-0.06	**0.7**	0.56	-0.05	**0.57**	0.66
36. BOYTIMEGIRL	0.07	-0.09	0.19	**0.37**	0.72	0.09	-0.04	**0.47**	0.76	0.13	**0.45**	0.77
19. BOYATTRGIRL	-0.07	-0.03	**0.38**	-0.07	0.89	-0.2	-0.12	**0.42**	0.85	-0.06	0.29	0.91
53. BOYPREGNO*	0.04	**0.76**	0.01	0.23	0.39	0.12	**0.83**	-0.03	0.4	-0.54	**0.35**	0.59
52. BOYPROVIDE*	-0.04	**0.65**	0.14	0.07	0.49	-0.03	**0.66**	0.09	0.51	-0.56	**0.36**	0.58
60. BOYPREGRESP*	-0.15	**0.49**	0.14	0.24	0.56	-0.02	**0.64**	0.14	0.52	-0.53	**0.4**	0.56
35. BOYLOVEGF*	-0.07	**0.4**	-0.14	-0.03	0.79	-0.03	**0.42**	-0.25	0.8	-0.37	-0.06	0.86
21. BOYCHASEGIRL	0.28	0.08	0.22	-0.06	0.88	–	–	–	–	–	–	–
22. BOYHOMOATTRACT*	0.23	-0.08	0.25	0.02	0.85	–	–	–	–	–	–	–
38. BOYHOMOREL*	0.02	-0.14	-0.68	0.07	0.54	–	–	–	–	–	–	–
40. BOYFINDLOVE	0.27	-0.17	0.34	0.08	0.68	–	–	–	–	–	–	–
41. BOYHOMOPARENT*	-0.3	-0.08	-0.15	0.12	0.9	–	–	–	–	–	–	–
42. BOYDISTRACT*	-0.05	0.35	0.15	0	0.83	–	–	–	–	–	–	–

43. BOYTROUBLE*	-0.12	0.32	0.17	-0.05	0.81	–	–	–	–	–	–	–
54. BOYMARRY*	-0.22	-0.71	0.14	0.16	0.57	–	–	–	–	–	–	–
55. BOYLOVE*	-0.19	-0.62	0.19	0.27	0.57	–	–	–	–	–	–	–
56. BOYHOMOSEX*	-0.06	-0.21	-0.01	-0.82	0.29	–	–	–	–	–	–	–
Eigenvalue	5.19	4.38	1.93	1.58		4.94	3.19	1.85		4.47	2.89	
Proportion explained	0.36	0.34	0.30	0.25		0.45	0.41	0.30		0.63	0.37	

Femininity items	**All items (3 factor solution)**				**Refined (3 factor solution)**				**Refined (2 factor solution)**		
Items	**F1**	**F2**	**F3**	**Uniq**	**F1**	**F2**	**F3**	**Uniq**	**F1**	**F2**	**Uniq**
44. GIRLRELBOY	**0.72**	0.09	0.1	0.47	**0.71**	0.08	0.08	0.47	**0.69**	0.06	0.51
63. GIRLSEXOLDER	**0.61**	0.05	0.03	0.62	**0.64**	0	0.02	0.59	**0.63**	-0.04	0.61
59. GIRLSEXNOPREG	**0.59**	-0.09	-0.04	0.63	**0.6**	-0.1	-0.05	0.62	**0.59**	-0.18	0.65
43. GIRLTIMEBOY	**0.56**	-0.02	0.12	0.68	**0.6**	0.09	-0.04	0.64	**0.55**	-0.01	0.69
55. GIRLBFNORMAL	**0.47**	-0.09	-0.03	0.78	**0.44**	0	-0.13	0.78	**0.47**	0.06	0.77
51. GIRLSTUDYFIRST	**0.53**	-0.33	0.32	0.6	**0.56**	0.2	-0.3	0.63	**0.44**	-0.1	0.81
46. GIRLMANYBF	**0.42**	0.3	-0.08	0.76	0.33	-0.08	0.34	0.76	**0.43**	0.16	0.78
49. GIRLBAD	0.07	-0.15	**0.63**	0.66	0.1	**0.61**	-0.13	0.66	-0.02	**0.4**	0.84
32. GIRLSEDUCE	0.01	0.16	**0.55**	0.59	-0.01	**0.57**	0.18	0.57	-0.06	**0.63**	0.61
31. GIRLBLAME	-0.16	-0.25	**0.59**	0.7	-0.11	**0.56**	-0.22	0.7	-0.24	0.32	0.86
40. GIRLTORMENT	-0.05	-0.06	**0.47**	0.8	-0.06	**0.46**	-0.02	0.79	-0.13	**0.38**	0.85
42. GIRLIGNORE	-0.24	0.06	**0.4**	0.74	-0.22	**0.42**	0.06	0.75	-0.26	**0.44**	0.77
41. GIRLGIFTS	0.12	0.18	**0.39**	0.75	0.07	**0.4**	0.2	0.74	0.06	**0.49**	0.75
48. GIRLTROUBLE	-0.21	0.2	**0.38**	0.72	0.19	**0.39**	0.21	0.71	0.19	**0.48**	0.72
57. GIRLPREGOK	0.06	0.08	**0.36**	0.83	0.04	**0.36**	0.1	0.83	0.01	**0.4**	0.84
30. GIRLNOSEDUCE	0.12	**0.62**	0.05	0.59	0.02	0.14	**0.59**	0.57	0.15	**0.54**	0.67
34. GIRLWATCH	0.19	**0.54**	-0.03	0.7	0.11	0.03	**0.5**	0.72	0.22	**0.37**	0.79
36. GIRLPROTECT	0.2	**0.62**	-0.06	0.62	0.11	0.03	**0.54**	0.67	0.01	**0.56**	0.69
62. GIRLDUMPED	-0.07	**0.4**	0.24	0.68	-0.12	0.3	**0.36**	0.7	-0.07	**0.55**	0.7

64. GIRLTRICKED	0.04	**0.38**	0.29	0.67	-0.02	0.33	0.34	0.7	0.01	**0.56**	0.69
29. GIRLCOVER	0.05	**0.55**	-0.16	0.76	-0.03	-0.1	**0.52**	0.76	0.11	0.29	0.9
61. GIRLLOVE	0.04	0.27	0.28	0.84	–	–	–	–	–	–	–
60. GIRLHOMOSEX*	-0.77	-0.42	-0.19	0.29	–	–	–	–	–	–	–
53. GIRLHOMOATTRACT*	0.32	-0.19	-0.04	0.85	–	–	–	–	–	–	–
54. GIRLHOMOPARENT*	0.22	-0.32	-0.03	0.83	–	–	–	–	–	–	–
47. GIRLNOSTUDY	0.26	0.29	0.29	0.7	–	–	–	–	–	–	–
33. GIRLSDRESS	-0.27	-0.13	0.12	0.91	–	–	–	–	–	–	–
35. GIRLFIGHT	0.07	0.22	0.27	0.82	–	–	–	–	–	–	–
37. GIRLDISTBOY	0.02	0.27	0.07	0.91	–	–	–	–	–	–	–
38. GIRLNOALONE	0.15	0.32	-0.02	0.88	–	–	–	–	–	–	–
39. GIRLSTRUST	0.11	-0.02	0.09	0.98	–	–	–	–	–	–	–
45. GIRLHOMOREL*	-0.62	0.2	-0.07	0.59	–	–	–	–	–	–	–
50. GIRLPOPULAR	-0.21	0.16	0.21	0.85	–	–	–	–	–	–	–
52. GIRLRUMOUR	-0.09	0.29	0.2	0.81	–	–	–	–	–	–	–
56. GIRLPREGBLAME	-0.16	0.16	0.32	0.78	–	–	–	–	–	–	–
58. GIRLPREGSHAME	-0.3	0.34	0.03	0.77	–	–	–	–	–	–	–
Eigenvalue	5.2	4.5	2.1		4.2	3.4	1.8		4.14	3.1	
Proportion variance	0.40	0.37	0.32		0.44	0.36	0.30		0.54	0.49	

*Reverse coded items.

Note: Items with loadings greater than 0.35 and/or uniqueness greater than 0.80 are bolded. Preliminary loadings were estimated using the raw values (before imputation). All items are listed in the order of factor loadings.

APPENDIX 2.6 OVERVIEW OF COVARIATES

Covariates		
AGE Age at last birthday	Continuous (years)	Descriptive, LCR Chapter 5
AGECAT Age groups	Dichotomous 0=11-12 years 1=13-14 years	Descriptive Chapters 5-6
SEX Biological sex	Dichotomous 0=boy, 1=girl	Descriptive, LCR Chapters 5-6
BIRTHPLACE Born in the slum settelment	Dichotomous 0=no,1=yes	Descriptive, LCR Chapters 5-6
ETN Ethnic group	Categorical 0=Kikuyu 1=Lou 2=Luhya 3=Borana 4=Kamba 5=Somali 6=Other	Descriptive Chapter 5
WEALTH3 Socioeconomic status, wealth index with tertiles	Categorical 1=Poorest tertile 2=Middle poor terile 3=Least poor tertile	Descriptive, LCR Chapters 5-6
HHSIZE Nr of people living in household	Categorical 0=alone or one more person 1=2-3 other people ≥4 other peeple	Descriptive, LCR Chapters 5-6
ORPHAN Family structure, whether parents are alive	Categorical 0=Both parents alive 1=Single/double orphan	Descriptive, LCR Chapters 5-6
PARENTLIVE Whether parents live together	Dichotmous 0=No 1=Yes	Descriptive, LCR Chapters 5-6
OLDER_BRO_C Age of brothers, if any	Categorical 0=No brother 1=Younger brother(s) 2=Older brother(s)	Descriptive, LCR Chapters 5-6
OLDER_SIS_C Age of sister, if any	Categorical 0=No sister 1=Younger sister(s) 2=Older sister(s)	Descriptive, LCR Chapters 5-6
RELGION Main religion	Categorical 0=No religion 1= Catholic 2=Protestant	Descriptive Chapter 5

	3=Other Christian 4=Muslim	
RELIGIOUS Perceived importance of religion in life	Dichotmous 0=Low importance/no religion 1=High importance	Descriptive LCR Chapters 5-6
GPUBERTY Started periods or breasts growing (girls)	Dichotomous 0=no, 1=yes	Descriptive Chapter 5
BPUBERTY Started gential growth, beard, or voice change (boys)	Dichotomous 0=no, 1=yes	Descriptive Chapter 5
PUBERTY Started puberty (all)	Dichotomous 0=no, 1=yes	Descriptive LCR Chapters 5-6
BODYCHANGE Perceived body change relative to peers	0=About the same 1=Faster 2=Slower	Descriptive LCR Chapters 5-6
SCHOOLMISS Nr of days missed in school past month	0=None 1=1–2 2= ≥3 3= Not enrolled in school	Descriptive LCR Chapters 5-6
NGB_CONTROL Perceived neighborhood social control	Categorical 0=Low (25th percentile) 1=Moderate (50th percentile) 2=High (75th percentile) Scale Range: 0-10 Cronbach's alpha=0.78	Descriptive, LCR Chapter 5
MEDIAUSE Daily use of media on a typical day	0=No hours 1=1-2 hours 2= ≥ 3 hours	Bivariate Chapter 6
CLOSEFRIEND Number of close friends	0=No/one close friend 1=2–3 close friends 2=≥ 4 close friends	Bivariate Chapter 6
PEER_RELNORM Perceived peer romantic norm; the number of close friends who think it is important to have boy/girlfriends	0=None/few 1=Some/all	Bivariate, LCR Chapter 6
ACES, ACES_CAT 13 questions across 7 categories: <u>Emotional abuse or neglect</u> "Have you ever been scared or felt really bad because grown-ups called you names, said mean things to you, or said they didn't want you?" Have you ever been scared that your parents or other adults were going to hurt you badly (so that you were injured or killed)?" "Have you ever felt like you are not loved or cared about?"	ACES score of number of categories (0-7) Categorical 0=None 1=1 category 2=2-3 categories 4 =≥ 4 catgories	Bivariate, LCR Chapter 6

“Have you ever felt like you have no one that protects you?” ”Has there ever been a time of your life when you were totally on your own and had to take care of yourself for more than a short time?” <u>Sexual abuse</u> "Has an adult ever touched you in your private parts except when being bathed?" "Has an adult ever attempted or forced you to have sexual intercourse?" <u>Parental substance abuse</u> ”Have your parents/guardian ever drank too much alcohol or used drugs so they came home and were really abusive to you or your family?" <u>Parental mental health issues</u> "Have you ever seen your mother or father so sad that they couldn’t take care of you?" <u>Parental criminal behavior</u> "Have any of your parents ever been in prison/jail?" Intimate partner violence "Have you ever seen your mom being hit, beaten or threatened?" <u>Economic adversity</u> "Has there ever been a time when your family did not have enough food because they had no money?" "Has your family ever been forced to leave your home/house?"		
VIOLENCE_VICTIM Ever victimized of physcial violence from a boy/girl	0=No 1=Yes, by opposite/both sexes 2=Yes, by the same sex only	Bivariate, LCR Chapter 6
VIOLENCE_PERP Ever perpetrated physcial violence against a boy/girl	0=No 1=Yes, towards opposite/both sexes 2=Yes, towards same sex only	Bivariate, LCR Chapter 6

APPENDIX 2.7 LATENT CLASS MODEL ANNOTATIONS AND EQUATIONS

Number of parameters estimated in LCA according to different scenarios

Nr latent classes (J)	**Nr dichotomous indicator variables (M)**	**Nr of parameters estimated**			**Nr possible response patterns (y) (2^M-1)**
		Latent class probabilities (J-1)	Item response probabilities (J * M^1)	Total (J*M) + (J-1)	
2	5	1	10	11	31
2	6	1	12	13	63
2	7	1	14	15	127
2	8	1	16	17	255
2	9	1	18	19	511
2	10	1	20	21	1023
2	11	1	22	23	2047
2	12	1	24	25	4095
2	13	2	26	27	8191
3	5	2	15	17	31
3	6	2	18	20	63
3	**7**	**2**	**21**	**23**	**127**
3	8	2	24	26	255
3	9	2	27	29	511
3	10	2	30	32	1023
3	11	2	33	35	2047
3	12	2	36	38	4095
3	13	2	39	41	8191

Equation for Latent class model:

$$P\ (Y = y) = \sum_{c=1}^{C} P(L = c) \prod_{j=1}^{J} P\left(Y_j = y_j \middle| L = c\right)$$

Where:
y_j represent element j of a response pattern y.
Y = array of response patterns
P (L=c) probability of membership in latent class c, i.e. the latent class probability (η_c)
$P\left(Y_j = y_j \middle| L = c\right)$ is the conditional probability of choosing response y_j for item j given membership in class c

Equation for calculation of posterior probabilities of class membership[1]:

Let *y* represent the response pattern, and *L* represent the latent class.
I know the item response probability (response pattern given class membership): *P (y | L)*
I need the posterior probability (class membership given response pattern): ***P (L | y)***
Bayes's Theorem holds that: $P\ (A \mid B) = \frac{P(B \mid A)P(A)}{P(B)}$
Restated for LCA, this can be written as: $\boldsymbol{P\ (L \mid y)} = \frac{\boldsymbol{P(y \mid L)P(L)}}{\boldsymbol{P(y)}}$

[1] Collins LM, Lanza ST. Latent class and latent transition analysis: With applications in the social, behavioral, and health sciences: John Wiley & Sons;2010.

Equation for the calculation of predicted probability of class membership from logistic regression coefficients (pg. 495 in the Mplus user manual)[2].

To get the predicated probability by age and sex, I first estimated the log odds for membership in a particular class compared to the reference:

$$\log odds = \beta_0 + \beta_1 * age + \beta_2 * gender + \beta_3 * (age * gender)$$

To compute the probabilities for each class membership for each age and sex group (males 11-12, males 13-14, females 11-12, females 13-14), the estimated intercept log odds were exponentiated and summed, and then divided by the sum as follows:

Boys aged 11-12 (b1=0 and b2=0)	Coeff	Exp	P (exp/sum)
log odds (c=1)	-2.313	0.099	0.054
log odds (c=2)	-0.311	0.733	0.400
log odds (c=3)	0	1.000	0.546
Sum		1.832	
Boys aged 13-14 (b1=1 and b2=0)			
log odds (c=1)	0.023	1.023	0.239
log odds (c=2)	0.816	2.261	0.528
log odds (c=3)	0	1.000	0.233
Sum		4.285	
Girls aged 11-12 (b1=0 and b2=1)			
log odds (c=1)	-2.129	0.119	0.059
log odds (c=2)	-0.127	0.881	0.440
log odds (c=3)	0	1.000	0.500
Sum		2.000	
Girls aged 13-14 (b1=1 and b2=1)			
log odds (c=1)	-0.911	0.402	0.135
log odds (c=2)	0.457	1.579	0.530
log odds (c=3)	0	1.000	0.335
Sum		2.981	

Equation for the uncertainty classification rate for N using the 3-step approach[3]:

$$P_{c1,c2} = P(C = c_2|N = c_1) = \frac{1}{Nc_1} \sum_{N_i=c1} P(C_i = C_2|U_i)$$

N_i = most likely class variable for the *i*th observation
N_{c1} = number of observations classified in class c_1 by N
C_i = true latent class variable for the *i*th observation
U_i = class indicator variables for the *i*th observation

In the third step of the 3-step approach, N is a nominal indicator of the latent class variable C with pre-fixed uncertainty rates pre-fixed as the probabilities $q_{c1,c2}$.

$$q_{c1,c2} = P(N = c_1|C = c_2) = \frac{P_{c1,c2} N_{c1}}{\sum_c p_{c,c2} N_c}$$

[2] Muthén LK, Muthén BO (1998-2015) MPLUS User's Guide. Seventh Edition. Los Angeles, CA: Muthén & Muthén.
[3] Asparouhov T, Muthén B. Auxiliary Variables in Mixture Modeling: Three-Step Approaches Using Mplus. Structural Equation Modeling: A Multidisciplinary Journal. 2014;21: 329-341.

APPENDIX 3.1 EXAMPLE SEARCH STRATEGY.

For a full list of all search strategies, see the supplemental file "**S1 Table**" to the *Plos One* publication of Manuscript I: (http://journals.plos.org/plosone/article?id=10.1371/journal.pone.01578055)

Pubmed

1) Population: Young Adolescents (10-14 years)	
Key words:	adolesc*[tw] OR teen*[tw] OR tween*[tw] OR youth*[tw] OR young people*[tw] OR young person*[tw] OR middle school*[tw] OR puberty[tw] OR "middle childhood"[tw] OR preadolescent[tw]
Controlled vocabulary:	"Child" [Mesh] OR "Adolescent" [Mesh] OR "Puberty" [Mesh]
AND	
2) Gender attitudes	
Key words:	sex role*[tw] OR gender role*[tw] OR gender ident*[tw] OR gender attitud*[tw] OR gender belief*[tw] OR gender norm*[tw] OR gender stereotyp*[tw] OR gender bias*[tw] OR gendered[tw] OR gender perception*[tw] OR machismo*[tw] OR marianismo*[tw] OR macho*[tw] OR feminin*[tw] OR masculin*
Controlled vocabulary:	"Gender identity" [Mesh]
AND	
3) Factors that influence gender attitudes/'gender socialization'	
Key words:	social norm*[tw] OR social influence*[tw] OR interpersonal influence*[tw] OR expectation*[tw] OR interpersonal relation*[tw] OR socialization*[tw] OR acculturation*[tw] OR social value*[tw] OR stereotyped behavior*[tw] OR stereotyped behaviour* OR psychosexual development[tw]
Controlled vocabulary:	"Social perception" [Mesh] OR "Social environment" [Mesh] OR "Stereotyped Behavior" [Mesh] OR "Psychosexual development" [Mesh] OR Socialization [Mesh]

Date limiter: 1980-2014
Date of search: August 1, 2014
Total number of hits: 6127

APPENDIX 4.8 LATENT CLASS RESPONSE PATTERNS

Latent Class Indicators

- Know what kissing is
- Know what sex is
- Watched pornography
- Liked someone, they liked you back
- Spent time alone (without adults)
- Held hands
- Hugged/cuddled/kissed

Nr	Pattern	n	w%	Nr	Pattern	n	w%	Nr	Pattern	n	w%
1	1100000	150	40.9%	18	1001001	2	0.5%	35	1001010	1	0.3%
2	0000000	60	16.9%	19	1010000	2	0.5%	36	1001110	1	0.3%
3	1000000	40	11.2%	20	1100010	2	0.6%	37	1100001	1	0.3%
4	0100000	22	6.3%	21	1101100	2	0.5%	38	1100011	1	0.2%
5	1110000	15	4.3%	22	1101101	2	0.5%	39	1100111	1	0.3%
6	1101111	8	2.1%	23	1111010	2	0.5%	40	1101010	1	0.2%
7	1101011	5	1.3%	24	1111011	2	0.5%	41	1110001	1	0.3%
8	101000	4	1.1%	25	0000010	1	0.3%	42	1110010	1	0.3%
9	1101000	4	1.1%	26	0000101	1	0.2%	43	1110011	1	0.3%
10	1111111	4	1.2%	27	0001110	1	0.3%	44	1110100	1	0.3%
11	1100100	3	0.8%	28	0010000	1	0.3%	45	1111101	1	0.3%
12	1101110	3	0.8%	29	0011011	1	0.2%	46	1111110	1	0.2%
13	1111000	3	0.7%	30	0100001	1	0.3%				
14	0001000	2	0.6%	31	0100100	1	0.3%				
15	0001001	2	0.5%	32	0101111	1	0.3%				
16	0101010	2	0.5%	33	0110000	1	0.3%				
17	1000001	2	0.5%	34	1001000	1	0.2%				

APPENDIX 4.9 BIVARIATE ANALYSIS OF CLASS MEMBERSHIP

	Involved vs. Naïve	**Observant vs. Naïve**	**Involved vs. Observant**
	OR (95% CI)	OR (95% CI)	OR (95% CI)
Age (cont.)	2.99 (2.04, 4.39)***	1.48 (1.11, 1.97)**	2.02 (1.44, 2.82)***
Gender			
Boy	Ref	Ref	Ref
Girl	0.57 (0.27, 1.21)	1.06 (0.62, 1.8)	0.54 (0.26, 1.12) ±
Born in the settlement			
No	Ref	Ref	Ref
Yes	1.96 (0.75, 5.12)	0.86 (2.14, 0.34)	2.28 (0.89, 5.82) ±
Relative household wealth			
1 (poorest)	Ref	Ref	Ref
2 (middle poor)	1.15 (0.44, 2.97)	0.91 (1.91, 0.44)	1.25 (0.48, 3.24)
3 (least poor)	2.23 (0.88, 5.62) ±	1.23 (2.56, 0.59)	1.81 (0.74, 4.43)
Household size			
1-4 people	Ref	Ref	Ref
≥ 6 people	1.13 (0.53, 2.43)	0.68 (0.38, 1.19)	1.68 (0.82, 3.44)
People sleeping in the same room			
Alone or one more person	Ref	Ref	Ref
2-3 other people	0.92 (0.29, 2.97)	0.63 (0.18, 2.22)	1.46 (0.6, 3.58)
≥ 4 other people	0.35 (0.1, 1.24)	0.54 (0.18, 1.55)	0.66 (0.24, 1.81)
Family structure			
Both parents alive	Ref	Ref	Ref
Single/double orphan	3.36 (1.4, 8.07)**	1.28 (0.6, 2.74)	2.62 (1.14, 6.06)*
Parents live together			
No	Ref	Ref	Ref
Yes	0.37 (0.13, 1.02)±	0.64 (0.3, 1.35)	0.58 (0.22, 1.5)
Feel close to mother			
Not at all	Ref	Ref	Ref
Somewhat	1.55 (0.38, 6.39)	1.81 (0.69, 4.73)	0.86 (0.23, 3.28)
A lot	1.48 (0.39, 5.67)	1.69 (0.67, 4.29)	0.88 (0.25, 3.13)
Feel close to father			
Not at all	Ref	Ref	Ref
Somewhat	2.22 (0.72, 6.79)	2.08 (0.99, 4.39)±	1.06 (0.37, 3.02)
A lot	1.48 (0.49, 4.47)	0.83 (0.38, 1.82)	1.78 (0.58, 5.46)
Brothers			
No brother(s)	Ref	Ref	Ref
Younger brother(s)	1.33 (0.35, 5.07)	1.4 (0.47, 4.19)	0.94 (0.28, 3.22)
Older brother(s)	0.93 (0.29, 2.93)	0.78 (0.31, 1.92)	1.19 (0.38, 3.7)
Sisters			
No sister(s)	Ref	Ref	Ref
Younger sister(s)	0.86 (0.19, 3.97)	1.03 (0.27, 3.93)	0.84 (0.21, 3.42)

Older sister(s)	1.23 (0.31, 4.96)	0.69 (0.19, 2.48)	1.79 (0.55, 5.8)
Religiosity			
Low importance/no religion	Ref	Ref	Ref
High importance	0.5 (0.18, 1.37)	1.1 (0.44, 2.73)	0.45 (0.17, 1.21)
Started puberty			
No	Ref	Ref	Ref
Yes	5.92 (2.45, 14.34)***	1.58 (0.78, 3.21)	3.74 (1.7, 8.21)***
Body change relative to peers			
About the same	Ref	Ref	Ref
Faster	2 (0.84, 4.75)	1.05 (0.51, 2.17)	1.89 (0.85, 4.21)
Slower	1 (0.38, 2.66)	0.69 (0.33, 1.44)	1.44 (0.54, 3.85)
Days missed at school past month			
None	Ref	Ref	Ref
1–2	1.13 (0.42, 3.05)	1.71 (0.84, 3.47)	0.66 (0.25, 1.71)
≥3	2.31 (0.87, 6.12) ±	2.24 (1.05, 4.75)*	1.03 (0.4, 2.68)
Not enrolled in school	5.19 (0.76, 35.26) ±	2.56 (0.39, 16.82)	2.03 (0.4, 10.28)
School aspirations			
Complete primary/secondary	Ref	Ref	Ref
Complete college/university	0.37 (0.13, 1.02)±	0.64 (0.3, 1.35)	0.58 (0.22, 1.5)
Neighborhood social control			
Low (25th percentile)	Ref	Ref	Ref
Moderate (50th percentile)	1.11 (0.38, 3.23)	0.83 (0.4, 1.72)	1.34 (0.47, 3.79)
High (75th percentile)	1.52 (0.6, 3.82)	0.91 (0.47, 1.77)	1.66 (0.68, 4.08)

***p<0.001, **p<0.01 *p<0.05, ± p<.

APPENDIX 5.1 STRATIFIED LATENT CLASS REGRESSION MODELS BY SEX: MALES

Variable	Model 1		Model 2		Model 3		Model 4	
	Involved vs. Naïve	Involved vs. Observant	Involved vs. Naïve	Involved vs. Observant	Involved vs. Naïve	Involved vs. Observant	Involved vs. Naïve	Involved vs. Observant
	aOR (95% CI)	aOR (95% CI)	aOR (95% CI)	aOR (95% CI)	aOR (95% CI)	aOR (95% CI)	aOR (95% CI)	aOR (95% CI)
Female sexual risk	1.16 (0.52, 2.56)	0.87 (0.41, 1.83)	0.65 (0.22, 1.9)	0.57 (0.21, 1.55)	0.68 (0.21, 2.26)	0.6 (0.19, 1.86)	0.47 (0.12, 1.83)	0.4 (0.11, 1.46)
Male sexual prowess	1.11 (0.57, 2.18)	1 (0.52, 1.92)	1.39 (0.59, 3.3)	1.23 (0.55, 2.73)	1.27 (0.52, 3.13)	1.11 (0.5, 2.49)	1.12 (0.37, 3.33)	1.2 (0.41, 3.47)
Male sexual responsibility	1.45 (0.67, 3.11)	1.2 (0.58, 2.49)	1.93 (0.47, 7.95)	1.5 (0.49, 4.63)	2.04 (0.37, 11.39)	1.57 (0.4, 6.13)	2.04 (0.7, 5.95)	1.38 (0.56, 3.41)
Early heterosexual relationships	2.68 (1.35, 5.35)***	1.93 (1.06, 3.49)***	2.22 (1.05, 4.94)*	1.6 (0.84, 3.05)	2.03 (0.83, 4.96)	1.49 (0.78, 2.85)	3.21 (1.16, 8.88)*	*1.81 (0.9, 3.65)*±
Age (ref: 11-12 years)			9.2 (1.47, 57.38)*	3.17 (0.64, 15.83)	8.81 (1.13, 68.59)*	2.94 (0.5, 17.22)	10.76 (1.95, 59.33)*	*3.99 (0.87, 18.39)*±
Started puberty			7.4 (0.88, 62.52)±	2.39 (0.6, 9.51)	8.38 (1.04, 67.45)*	2.92 (0.76, 11.17)	14.21 (1.33, 151.37)*	*4.55 (0.88, 23.53)*±
Born in the settlement			3.28 (0.51, 21.26)	*4.4 (0.8, 24.27)*±	3.1 (0.52, 18.53)	*4.07 (0.81, 20.55)*±	3.16 (0.47, 21.37)	4.97 (1.29, 19.19)*
Single/double orphan			8.17 (1.5, 44.54)*	5.65 (1.03, 30.98)*	7.52 (1.41, 40.12)*	5.31 (1.01, 27.83)*	10.44 (1.97, 55.47)*	7.96 (1.87, 33.9)**
Household size ≥ 6 people (ref: 1-5 people)			1.37 (0.22, 8.51)	1.42 (0.32, 6.26)	1.47 (0.19, 11.08)	1.5 (0.3, 7.46)	1.4 (0.23, 8.42)	1.3 (0.29, 5.8)
Middle poor (ref: poorest)			1.11 (0.22, 5.61)	1.96 (0.47, 8.17)	1.14 (0.2, 6.5)	2.09 (0.48, 9.11)	2.39 (0.24, 24.12)	2.51 (0.53, 11.8)
Least poor (ref: poorest)			0.95 (0.2, 4.67)	0.91 (0.24, 3.42)	0.87 (0.16, 4.77)	0.9 (0.22, 3.74)	0.76 (0.05, 10.96)	0.63 (0.1, 4.08)
High religiosity (ref: low/no religion)			0.57 (0.12, 2.71)	0.41 (0.1, 1.63)	0.61 (0.12, 3.02)	0.45 (0.1, 1.98)	0.35 (0.06, 2.12)	0.36 (0.08, 1.6)
Close friends think having boy/girlfriends is important					2.33 (0.59, 9.23)	2.17 (0.65, 7.23)	2.4 (0.43, 13.34)	2.61 (0.71, 9.6)

Violence perpetration, opposite/both sex	55.81 (3.67, 847.66)±	20.43 (2.6, 160.29)**
Violence perpetration, only same sex	6.52 (0.45, 95.04)	2.01 (0.18, 22.77)
ACE categories (cont.)	1.96 (0.91, 4.25)	1.14 (0.76, 1.69)

	Model 1 Observant vs. Naïve	**Model 2** Observant vs. Naïve	**Model 3** Observant vs. Naïve	**Model 3** Observant vs. Naïve
	aOR (95% CI)	aOR (95% CI)	aOR (95% CI)	aOR (95% CI)
Female sexual risk	1.34 (0.75, 2.38)	1.15 (0.63, 2.1)	1.14 (0.62, 2.08)	1.16 (0.5, 2.7)
Male sexual prowess	1.11 (0.71, 1.73)	1.13 (0.71, 1.82)	1.14 (0.69, 1.87)	0.93 (0.55, 1.59)
Male sexual responsibility	1.21 (0.79, 1.84)	1.29 (0.71, 2.35)	1.3 (0.68, 2.47)	1.47 (0.71, 3.06)
Early heterosexual relationships	1.4 (0.82, 2.38)	1.39 (0.68, 2.84)	1.36 (0.64, 2.91)	1.77 (0.56, 5.57)
Age 13-14 years (ref: 11-12 years)		2.9 (1.16, 7.22)*	3 (1.12, 8.02)*	2.69 (1, 7.26)*
Started puberty		3.09 (0.55, 17.25)	2.87 (0.49, 16.94)	3.12 (0.43, 22.86)
Born in the settlement		0.75 (0.23, 2.4)	0.76 (0.23, 2.55)	0.63 (0.12, 3.37)
Single/double orphan		1.44 (0.58, 3.62)	1.42 (0.55, 3.65)	1.31 (0.41, 4.16)
Household size ≥ 6 people (ref: 1-5 people)		0.96 (0.36, 2.58)	0.98 (0.35, 2.71)	1.07 (0.33, 3.54)
Middle poor (ref: poorest)		0.57 (0.17, 1.91)	0.54 (0.15, 1.97)	0.95 (0.12, 7.87)
Least poor (ref: poorest)		1.04 (0.3, 3.57)	0.96 (0.26, 3.59)	1.21 (0.12, 12)
High religiosity (ref: low/no religion)		1.38 (0.33, 5.7)	1.34 (0.33, 5.49)	0.97 (0.16, 5.76)
Close friends think having boy/girlfriends is important			1.07 (0.33, 3.52)	0.92 (0.21, 3.96)
Violence perpetration, opposite/both sex				2.73 (0.39, 19.36)
Violence perpetration, only same sex				3.24 (0.78, 13.45)
ACE categories (cont.)				1.73 (0.75, 3.97)

*** p<0.001, ** p<0.01, * p<0.05, ±p<0.1

APPENDIX 5.2 STRATIFIED LATENT CLASS REGRESSION MODELS BY SEX: FEMALES

Variable	Model 1		Model 2		Model 2 (rev)		Model 3		Model 4	
	Involved vs. Naïve	Involved vs. Observant	Involved vs. Naïve	Involved vs. Observant	Involved vs. Naïve	Involved vs. Observant	Involved vs. Naïve	Involved vs. Observant	Involved vs. Naïve	Involved vs. Observant
	aOR (95% CI)	aOR (95% CI)	aOR (95% CI)	aOR (95% CI)	aOR (95% CI)	aOR (95% CI)	aOR (95% CI)	aOR (95% CI)	aOR (95% CI)	aOR (95% CI)
Female sexual risk	1.78 (0.06, 53.29)	1.71 (0.08, 34.97)	0.59 (0.13, 2.63)	0.65 (0.15, 2.74)	0.76 (0.18, 3.14)	0.84 (0.21, 3.39)	0.79 (0.14, 4.34)	0.89 (0.17, 4.83)	0.94 (0.15, 5.89)	1.04 (0.17, 6.51)
Male sexual prowess	1.44 (0.7, 2.93)	1.44 (0.74, 2.78)	1.3 (0.64, 2.65)	1.39 (0.71, 2.69)	1.23 (0.61, 2.48)	1.27 (0.67, 2.43)	1.22 (0.52, 2.82)	1.24 (0.56, 2.71)	1.23 (0.42, 3.58)	1.25 (0.46, 3.42)
Male sexual responsibility	0.9 (0.32, 2.55)	0.58 (0.2, 1.64)	2.62 (0.59, 11.73)	1.74 (0.38, 7.92)	2.06 (0.62, 6.84)	1.36 (0.39, 4.68)	2.17 (0.5, 9.29)	1.46 (0.34, 6.31)	2.09 (0.74, 5.92)	1.43 (0.5, 4.07)
Early heterosexual relationships	3.98 (1.07, 14.79)*	3.35 (1.07, 10.49)*	3.83 (1.55, 9.43)**	3.68 (1.58, 8.55)**	4.31 (1.85, 10.06)**	3.98 (1.82, 8.68)**	4.13 (1.73, 9.85)**	3.64 (1.66, 8.01)**	5.53 (1.38, 22.13)**	4.62 (1.35, 15.75)**
Age (ref: 11-12 years)			3 (0.72, 12.49)	2.05 (0.51, 8.26)	3.25 (0.76, 13.93)	2.25 (0.54, 9.36)	3.25 (0.76, 13.93)	2.78 (0.68, 11.36)	*3.99 (0.93, 17.12)*±	1.8 (0.44, 7.38)
Started puberty			204688526.76 (204688526.76, 204688526.76)	121327007.55 (48864415.98, 301246673.38)						
Born in the settlement			0.79 (0.17, 3.64)	0.83 (0.2, 3.48)	0.87 (0.19, 3.96)	0.97 (0.23, 4.15)	0.78 (0.16, 3.88)	0.87 (0.19, 4.01)	0.84 (0.18, 3.94)	1.01 (0.23, 4.4)
Single/double orphan			4.84 (0.67, 35.11)	6.55 (0.99, 43.31)	3.51 (0.69, 17.78)	4.66 (0.92, 23.64)±	4.23 (0.69, 25.84)	5.79 (0.94, 35.55)	4.66 (0.82, 26.59)±	6.55 (1.24, 34.67)*
Household size ≥ 6 people (ref: 1-5 people)			2.2 (0.47, 10.41)	3.28 (0.74, 14.49)	1.88 (0.43, 8.28)	2.95 (0.7, 12.42)	1.9 (0.41, 8.87)	2.91 (0.66, 12.82)	2.3 (0.39, 13.66)	3.69 (0.65, 20.84)
Middle poor (ref: poorest)			0.32 (0.06, 1.82)	0.32 (0.06, 1.8)	0.31 (0.05, 1.93)	0.32 (0.05, 1.99)	0.29 (0.04, 2.29)	0.3 (0.04, 2.37)	0.21 (0.01, 4.79)	0.23 (0.01, 4.97)
Least poor (ref: poorest)			5.1 (0.55, 47.77)	3.22 (0.38, 26.97)	4.88 (0.72, 33.05)	2.96 (0.46, 18.88)	6.04 (0.72, 50.73)	3.75 (0.48, 29.23)	6.38 (1.22, 33.42)*	4.26 (0.92, 19.64)
High religiosity (ref: low/no religion)			0.21 (0.03, 1.8)	0.27 (0.04, 1.69)	0.21 (0.03, 1.49)	0.25 (0.04, 1.48)	0.18 (0.02, 1.32)*	0.21 (0.04, 1.21)*	0.23 (0.03, 1.68)	0.28 (0.04, 1.81)
Close friends think having boy/girlfriends is							1.77 (0.37, 8.54)	2.56 (0.59, 11.19)	1.17 (0.14, 9.78)	1.62 (0.22, 12.09)

important		
Violence perpetration, opposite/both sex	5.23 (0.55, 50.04)	8.67 (0.9, 83.25)
Violence perpetration, only same sex	0.24 (0.01, 4.68)	0.23 (0.01, 3.89)
ACE categories (cont.)	1.03 (0.65, 1.64)	1.13 (0.72, 1.78)

	Model 1 Observant vs. Naïve	**Model 2** Observant vs. Naïve	**Model 3** Observant vs. Naïve	**Model 3 (rev)** Observant vs. Naïve	**Model 4** Observant vs. Naïve
	aOR (95% CI)	aOR (95% CI)	aOR (95% CI)	aOR (95% CI)	aOR (95% CI)
Female sexual risk	1.04 (0.52, 2.1)	0.92 (0.49, 1.7)	0.91 (0.49, 1.68)	0.88 (0.47, 1.67)	0.9 (0.44, 1.83)
Male sexual prowess	1 (0.62, 1.61)	0.94 (0.58, 1.54)	0.97 (0.6, 1.58)	0.99 (0.6, 1.61)	0.98 (0.58, 1.65)
Male sexual responsibility	1.55 (0.89, 2.71)	1.51 (0.85, 2.68)	1.52 (0.84, 2.73)	1.49 (0.82, 2.7)	1.47 (0.8, 2.69)
Early heterosexual relationships	1.19 (0.67, 2.09)	1.04 (0.58, 1.86)	1.08 (0.62, 1.9)	1.13 (0.63, 2.04)	1.2 (0.62, 2.32)
Age 13-14 years (ref: 11-12 years)		1.21 (0.5, 2.94)	1.47 (0.66, 3.25)	1.44 (0.65, 3.21)	1.44 (0.64, 3.25)
Started puberty		1.69 (0.68, 4.18)			
Born in the settlement		0.95 (0.41, 2.22)	0.9 (0.39, 2.04)	0.89 (0.39, 2.06)	0.83 (0.35, 1.96)
Single/double orphan		0.74 (0.25, 2.17)	0.75 (0.25, 2.31)	0.73 (0.24, 2.26)	0.71 (0.22, 2.27)
Household size ≥ 6 people (ref: 1-5 people)		0.67 (0.29, 1.53)	0.64 (0.28, 1.44)	0.65 (0.29, 1.48)	0.62 (0.27, 1.44)
Middle poor (ref: poorest)		1.01 (0.4, 2.52)	0.97 (0.39, 2.43)	0.97 (0.39, 2.42)	0.91 (0.35, 2.33)
Least poor (ref: poorest)		1.59 (0.52, 4.81)	1.65 (0.55, 4.96)	1.61 (0.53, 4.88)	1.5 (0.49, 4.61)
High religiosity (ref: low/no religion)		0.79 (0.14, 4.47)	0.83 (0.16, 4.28)	0.86 (0.17, 4.32)	0.72 (0.27, 1.93)
Close friends think having boy/girlfriends is important				0.69 (0.25, 1.87)	0.83 (0.16, 4.17)
Violence perpetration, opposite/both sex					0.6 (0.1, 3.64)
Violence perpetration, only same sex					1.05 (0.35, 3.14)
ACE categories (cont.)					0.91 (0.69, 1.2)

*** p<0.001, ** p<0.01, * p<0.05, ±p<0.1

Curriculum Vitae

Anna Elsa Marianne Kågesten
DOB: 1983-09-12, Enköping, Sweden
Address: Tjärhovsgatan 32, CO Löfgren 1402, 11621 Stockholm, Sweden
Tel: +46733595360; E-mail: akaagesten@jhu.edu; Twitter: @annakgsten

Education

Sept 2012 – March 2017 **PhD in Population, Family and Reproductive Health**
Johns Hopkins Bloomberg School of Public Health, Baltimore
- Focus of studies: Epidemiology and Adolescent Reproductive Health
- Dissertation title: *A window of opportunity: Gender attitudes and patterns of romantic and sexual experiences in early adolescence*.
- Certificates: Maternal and Reproductive Health, Population Health
- Advisor: Robert Wm. Blum, MD MPH PhD

June 2011 – May 2012 **Master of Public Health (MPH)**
Johns Hopkins Bloomberg School of Public Health, Baltimore
- Capstone title: *Assessing Sexual Risk among Youth in Sweden: Does Immigrant Status matter?*
- GPA: 4.0 on a 4-point scale.

Aug 2004 – June 2007 **Bachelor in Public Health Science with Health Economy (BSc)**
University of Gothenburg, Gothenburg
- Thesis title: *It just goes in through one ear and out through the other: reaching youth with HIV/STI prevention messages in Sweden.*

Research experience

April 2016 – March 2017 **Research consultant**
Guttmacher Institute**,** New York
- Co-author on a Guttmacher paper on the sexual and reproductive health and needs of 10-14 -year-olds in low- and middle-income countries.
- Tasks include literature searches, synthesis on prevalence indicators, writing and extensive editing of report chapters.

May 2013 – To date **Research consultant**
WHO Department of Reproductive Health and Research, Geneva
- Conceptualized and implemented a systematic review on comprehensive adolescent health programs inclusive of SRH services, published in *American Journal of Public Health* (2013-2014).
- Conceptualized and implemented a mixed-methods systematic review on factors that influence early adolescent gender attitudes, published in *Plos One* (2014-2016).
- Currently supporting the development of Programme Reporting Standards (PRS) for SRHR, involving 4 steps (2015 – to date):
  1. Conceptualized and implemented a systematic review of reporting tools and items applicable to SRH (published in *Plos One*);
  2. Designed, implemented and analyzed an online Delphi consensus survey with 80 invited experts to further refine the PRS;
  3. Contributed to a technical consultation with 30 invited experts to further refine the tool; compiled and analyzed feedback received and modified the PRS accordingly.
  4. Conducted a desk review pilot of the relevance and feasibility of the PRS with four programmes. Lead author of a WHO publication and

a peer-reviewed manuscript to disseminate the final tool.

Jan 2013 – To Date

Study Coordinator/Research Assistant, Global Early Adolescent Study
Johns Hopkins Bloomberg School of Public Health, Baltimore
www.geastudy.org

- Coordinated the conceptualization and implementation of a 15-country study on gender norms, sexuality and health among 10-14 -year-olds. Tasks included grant preparation, writing of study protocols, monitoring and training of study staff, and extensive support to all study sites.
- Contributed to the development, piloting and final implementation of qualitative and qualitative data collection instruments across all sites.
- Conceptualized and led the implementation of the sexual health module, which also form the basis for my PhD dissertation.
- I was the study coordinator from Jan 2013 to Sept 2015, and left this position in order to devote more time to my dissertation work. I remain involved with the study as co-investigator and research assistant.

April – Oct 2014

Co-investigator, Very Young Adolescents in Humanitarian Settings
Johns Hopkins Bloomberg School of Public Health, Baltimore

- Co-investigator of a study on the SRH needs and risks of young adolescents in humanitarian contexts, implemented by WRC, IMC, Save the Children, Adolescent Reproductive Health Network and American University in Beirut; funded by CDC.
- Designed the quantitative survey which was implemented in the Kobe refugee camp (Etihiopia) and the Mae Sot and Phop Phra migrant communities (Thailand). Analyzed and led the publication of findings, forthcoming in a special supplement to *Conflict and Health.*

Nov – Dec 2015
Aug - Oct 2014
Jan 2012

Pre-doctoral fellow
African Population and Health Research Center**,** Nairobi

- Assisted the formative research for the GEAS in Nairobi in 2012.
- Supported the GEAS training and qualitative data collection activities with n=30 young adolescents and their parents (in-depth interviews and focus groups) in Nairobi during the fall of 2014.
- Led the GEAS quantitative data collection with n=630 11-14-year-olds in Nairobi in 2015, including training, implementation and monitoring of the fieldwork using mobile technology platforms.

Oct 2011 – March 2013

Teaching Assistant
Johns Hopkins Bloomberg School of Public Health, Baltimore

- Epidemiology and Public Health Impact of HIV and AIDS (2011/2012)
- Advanced Topics and Control of HIV and AIDS (2012)
- Reproductive and Perinatal Epidemiology (2013)

Aug 2007 – June 2009

Assistant Course Director
University of Gothenburg, Institute for Health Care and Sciences

- Co-designed and facilitated the interdisciplinary class ”Professional conversation with youth about sexuality and relationships”.

Program and policy experience

Feb 2015 – Jan 2016
April 2013 – Dec 2013

Youth coordinator, International Conference on Family Planning (ICFP)
Bill & Melinda Gates Institute for Population and Reproductive Health, Baltimore

- Coordinator of the youth subcommittee, including members from 30 different NGOs, Universities and multilateral organs, as part of the world's largest conference on family planning, ICFP, in 2013 & 2016.
- Led the selection of 60 youth delegates aged 18-25 years through an online video contest; planned and executed a 2-day training for over 300 youth delegates in collaborations with 15 different NGOs.

Dec 2011 – Feb 2012

Consultant, Advance Family Planning (www.advancefamilyplanning.org)
Bill & Melinda Gates Institute for Population and Reproductive Health, Baltimore

- Development of a landscape analysis framework to monitor key indicators for the FP 2020 commitments in 8 partner countries.

Jan 2010 – To Date
(Leave of absence for graduate studies since June 2011)

SRHR Program Officer
Knowledge Center for Sexual Health, Region Västra Götaland, Gothenburg

- Management and development of regional and national projects related to youth and young adult SRHR. Selected projects include:
- Contributed to the development of a regional SRHR strategy to strengthen the coordination of family planning and HIV/STI prevention efforts.
- Trained teachers and youth-clinic staff including midwives in methods for teaching comprehensive sexuality education and SRHR.
- Led and monitored social and behavior change communication interventions including the national campaign for World Aids Day in 2009 and 2010, focused on HIV-related discrimination and stigma.
- Managed a regional network for HIV prevention with representatives from the healthcare sector, schools, Universities and NGOs.

Aug 2008 – Dec 2009

HIV/STI Program Officer
Gothenburg Department of Prevention and Development, Gothenburg

- Developed strategies and monitored local HIV and STI prevention interventions in collaboration with partners at regional and national levels.
- Coordinated and facilitated trainings of school and health care staff in comprehensive sexuality education and SRHR.

April 2007 – Nov 2008

Sexual Health Peer Educator
Partille Youth Clinic and Kungälv Youth Clinic, Partille

- Facilitated interactive workshops about HIV/AIDS and sexual health based on experiences with prevention work in South Africa and Sweden.

Aug 2007 – Aug 2008

Sexual Health Project Manager
Partille Youth Clinic, Partille

- Coordinated and evaluated two peer education-projects about SRHR including HIV and unintended pregnancies at high schools.
- Designed and facilitated the training of peer educators. Authored manuals for teaching youth about sexual and reproductive health.

Nov 2006 – Dec 2006

Program Intern
HIV & AIDS Unit, Nelson Mandela Metropolitan University, Port Elizabeth

- Completed training to become certified HIV/AIDS peer educator.
- Fieldwork including quantitative data collection and analysis.

Feb 2010 – May 2010

TV Program Host, RFSU-TV Gothenburg, www.rfsu.se/gbgtv
Swedish Association for Sexuality Education (RFSU), Gothenburg

- Hosted eleven episodes of a SRHR education program targeting young adults in the Gothenburg vicinity, broadcasted through local TV.

Commissions of trust

Nov 2016 – To Date	**Youth Steering Committee member,** International Association for Adolescent Health World Congress 2017 (India)
April 2013 – Feb 2016	**Youth sub-committee Co-chair**, International Conference on Family Planning 2013 (Addis Ababa) and 2016 (Indonesia)
July 2011 – June 2012	**Vice President,** JB Grant Global Health Society, Johns Hopkins Bloomberg School of Public Health, US
Feb 2008 – Feb 2009	**Vice President,** Riksförbundet för Sexuell Upplysning (RFSU) Gothenburg chapter, Sweden
Jan 2006 – Jan 2007	**Vice President,** Hälsovetenskapliga studentkåren (Student Assembly for Health Sciences), University of Gothenburg, Sweden
May 2005 – Jan 2006	**President,** Folkhälsovetenskapliga sektionen (Public Health Section of the Study Assembly), University of Gothenburg, Sweden

Peer-reviewed publications

Published *(by date)*

- Moreau C, **Kågesten AE**., Blum RW (2016). Sexual dysfunction among youth: an overlooked sexual health concern. *BMC Public Health*
- Peitzmeier SM, **Kågesten A**, Acharya R, Cheng Y, Delany-Moretlwe S, Olumide A, Blum RW, Sonenstein F, Decker MR (2016). Past-year IPV perpetration prevalence and correlates among adolescent males in disadvantaged neighborhoods in four cities globally. *Journal of Adolescent Health.*
- **Kågesten A**, Gibbs S, Moreau C, Chandra-Mouli V, Blum RW. Amin, A (2016). Understanding factors that shape gender attitudes in early adolescence: A mixed-methods systematic review. *PLOS One.*
- **Kågesten A**, Tunçalp Ö, Ali M, Chandra-Mouli V, Tran N, Gülmezoglu M. (2015). A Systematic Review of Reporting Tools Applicable to Sexual and Reproductive Health Programmes: Step 1 in Developing Programme Reporting Standards. *PLOS One.*
- **Kågesten A**, Bajos N, Bohet A, Moureau, C (2015). Male experiences of unintended pregnancies: prevalence and correlates. *Human Reproduction*
- **Kågesten A**, Parekh J, Tunçalp Ö, Turke S, Blum RW (2015). Comprehensive Adolescent Health Programs that Improve Sexual and Reproductive Health: A Systematic Review. *American Journal of Public Health.*
- **Kågesten A** and Blum RW (2015). Characteristics of youth who report early sexual experiences in Sweden. *Archives of Sexual Behavior.*
- Brahmbhatt H, **Kågesten A**, Emerson M, Acharya R, Olumide A, Ojengbede D, Chaohua, L, Sonenstein F, Blum R, Delany-Moretlwe S (2015). Prevalence of teenage pregnancy across 5 urban disadvantaged settings. *Journal of Adolescent Health.*

Accepted *(forthcoming)*

- **Kågesten AE,** Tunçalp Ö, Portela A, Ali M, Tran N, Gülmezoglu M. Programme Reporting Standards (PRS) for sexual, reproductive, maternal, newborn, child and adolescent health (Submitted).
- **Kågesten AE,** Zimmerman L, Robinson C, Lee C, Bawoke T, Osman S, Schlect J (Forthcoming 2017). Transitions into puberty and access to sexual and reproductive health information in two humanitarian settings: A cross-sectional survey of very young adolescents from Somalia and Myanmar. *Conflict and Health.*
- De Meyer S, **Kågesten A,** Mmari K, McEachran J, Kabiru C, Maina B, Jerves E, Currie C, Chilet E, Michielsen K (Forthcoming 2017). "Boys should have the courage to ask a girl out": Gender norms in early adolescent romantic relationships. *Journal of Adolescent Health.*
- Yu C, Zuo X, Blum RW, Tolman D, **Kågesten A**, Mmari K, De Meyer S, Michielsen K, Basu S, Acharya R, Lian Q, Lou C (2016). Marching to a different drummer: A cross-cultural comparison of young adolescents who challenge gender norms. *Forthcoming in Journal of Adolescent Health*

- Woog V, **Kågesten A** and Prada E (Forthcoming 2017). The Sexual and Reproductive Health Needs of Very Young Adolescents (10–14) in Developing Countries: What Does the Evidence Show? Guttmacher Institute; New York, NY.
- Turke S, Caldas SV, **Kågesten A,** Parsons J, Ahn Young Ji, Winch P (Forthcoming 2017). Seeing the growth: Strengthening teacher-student connectedness through Outward Bound excursions. *Journal of Youth Development.*

Presentations

Oral conference presentations *(*presenting author)*

- **Kågesten A***, Gibbs S, Moreau C, Chandra-Mouli V, Blum RW. Amin, A. Understanding factors that shape gender attitudes in early adolescence: A mixed-methods systematic review. Young Lives conference on Adolescence, Youth and Gender. Oxford, Sept 2016.
- **Kågesten A***, Gibbs S, Moreau C, Chandra-Mouli V, Blum RW. Amin, A. Understanding factors that shape gender attitudes in early adolescence: A mixed-methods systematic review. 4th International Conference on Family Planning (ICFP). Bali, Jan 2016.
- **Kågesten A***, Tunçalp Ö, Ali M, Chandra-Mouli V, Tran N, Gülmezoglu M. Developing Programme Reporting Standards for Sexual and Reproductive Health. 4th ICFP. Bali, Jan 2016.
- **Kågesten A***, Bajos N, Bohet A, Moreau, C. Men's experiences of unintended pregnancies. Oral presentation at the Population Association of America annual meeting. Boston, May 2014.
- Brahmbhatt H, **Kågesten A***, Emerson M, Acharya R, Olumide A, Ojengbede D, Chaohua, L, Sonenstein F, Blum R, Delany-Moretlwe S. Prevalence of teenage pregnancy across 5 urban disadvantaged settings. American Association for Public Health annual meeting. New Orleans, Nov 2014.

Poster presentations *(*presenting author)*

- Peitzmeier SM*, **Kågesten A**, Acharya R, Cheng Y, Delany-Moretlwe S, Olumide A, Blum RW, Sonenstein F, Decker MR. Past-year IPV perpetration among urban adolescent males: preliminary findings from a cross-national study. National Conference on Health and Domestic Violence. Washington DC, March 2015.
- **Kågesten A***. Assessing gender norms among young adolescents in Nairobi information settlements. Johns Hopkins Global Health Day. Baltimore, April 2015.
- **Kågesten A,** Zimmerman L*, Schlect J, Robinson C. Sexual and reproductive health during Transitions into adolescence in two humanitarian settings". Population Association of America annual meeting. San Diego, April 2015.
- Schlect J, Zimmerman L*, **Kågesten A,** Robinson C. Transitions into adolescence in two humanitarian settings. 4th ICFP. Bali, Jan 2016.
- Moreau C, **Kågesten A***, Blum RW. Sexual dysfunction among youth: an overlooked sexual health concern. Society for Adolescent Medicine and Health annual meeting, Los Angeles, March 2015.
- Moreau C, **Kågesten A***, Blum RW. Sexual dysfunction among youth: an overlooked sexual health concern. Dep. of Population, Family and Reproductive Health Research Day. Baltimore, April 2015.
- **Larsson A*** and Blum RW. Characteristics of youth with early sexual debut in Sweden. Dep. of Population, Family and Reproductive Health Research Day. Baltimore, May 2013.
- **Larsson A*** and Blum RW. Characteristics of youth with early sexual debut in Sweden. Society for Adolescent Health and Medicine annual meeting. Atlanta, March 2013.

Invited lectures and other presentations

- *The Global Early Adolescent Study: an exploration of gender and social relations.* Presented at the Swedish International Development Cooperation (SIDA). Stockholm, May 2016.
- *The Global Early Adolescent Study: Measuring gender norms among young adolescents.* Women Deliver 2016 conference side session. Copenhagen, May 2016.
- *Programme Reporting Standards. Overview of development.* WHO-USAID side event at the Social and Behavioral Change Communication Summit. Addis Ababa, Feb 2016.

- *Youth and ICFP*. Presented at the 4th ICFP Youth pre-conference. Bali, Jan 2016.
- *A systematic review of factors that shape gender attitudes in early adolescence*. Global Early Adolescent Study Advisory Committee meeting. Geneva, June 2015.
- *Peer education and Sexual and Reproductive Health* and *Comprehensive Adolescent Health Programs*. Presented at the Packard Foundation Day of Learning. Palo Alto, March 2015.
- *What did we find? Sexual and Reproductive Health in the WAVE study*. Department of Population, Family and Reproductive Health alumni event. Baltimore, Jan 2015.
- *Vignette Development*. Global Early Adolescent Study qualitative data collection training. Baltimore, Jan 2015.
- *Sexual and Reproductive Health Needs and Risks of VYAs in Humanitarian Contexts*. End-of-project meeting with Women's Refugee Commission, Johns Hopkins University, Save the Children and International Medical Corps. Baltimore, July 2014.
- *Researching sexual behaviors among young adolescents.* The Global Early Adolescent Study qualitative data collection training. Baltimore, June 2014.
- *Sexual and Reproductive Health in Early Adolescence*. SIDA, Stockholm, March 2014.
- *Reconsidering Race/Ethnicity: the ethics of data collection and analysis by characteristics*. Population, Family and Reproductive Health department seminar. Baltimore, Oct 2013.
- *Teenage Pregnancy in the WAVE study*. Population Family and Reproductive Health department seminar. Baltimore, March 2014**.**

Honors and awards

2016	Nominee for 120 under 40: The New Generation of Family Planning Leaders (http://www.120under40.org/nominee/anna-kagesten)
2015	Dissertation research travel award, Bill and Melinda Gates Institute
2015	Caroline Cochrane Award for Population and Reproductive Health
2014/2015	Daphne Purvis Award, Graduate Women International Fellowship
2013/2014/2016	Fellowship in Family Planning, Johns Hopkins School of Public Health
2014	Global Health Field Research Award, Johns Hopkins School of Public Health
2013	Edie Moore Travel Scholarship, Society for Adolescent Health and Medicine
2011	Fulbright Grant, Fulbright Commission, Sweden.
2011/2014	International Peace Scholar, P.E.O International
2011/2012	MPH Global Health Award, Johns Hopkins School of Public Health

Language skills

Swedish (native), English (fluent), Spanish (basic) French (basic)

Computer skills

STATA, R Studio, SPSS, MPlus, Atlas.ti, Endnote, Microsoft Office

References

Robert Wm Blum, MD, MPH, Ph.D.
Professor, Department of Population, Family and Reproductive Health, JHSPH; Tel: (+1) 410 955-3384, E-mail: rblum [at] jhu.edu

Caroline Moreau, MD, MPH, Ph.D.
Associate Professor and William G. Robertson Junior Professor in Population and Family Planning, Department of Population, Family and Reproductive Health, JHSPH; Tel: (+1) 410-502-8951, E-mail: cmoreau2 [at] jhu.edu

Özge Tunçalp, MD, MPH, Ph.D.
Scientist, Department of Reproductive Health and Research, World Health Organization; E-mail: tuncalpo [at] who.int